COAL AGE

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TWO WANT ADS

There are two sides to every question. In the matter of employment, this truth is too often overlooked. The following synopses constitute specifications looking both ways.

The Employer

I Want An Employee

1. Who is sober.
2. Who is intelligent.
3. Who is industrious.
4. Who takes a personal interest in my business other than that arising from his wages.
5. Who is willing to devote his whole time, his best efforts and his highest intelligence to his duties.
6. Who possesses aggressiveness, ingenuity and initiative.
7. Who will devote the same energy to my business as he would to his own.
8. Who possesses personal ambition.
9. Who is courteous and respectful.
10. Who is honest.

I offer opportunities for advancement to such an employee.

The Employee

I Want An Employer

1. Who will recognize my individuality as a man.
2. Who will regard and treat me as a human being, not as a machine or a mechanical part of his business.
3. Who will recognize and admit the fact that my skill and brawn are as necessary to the success of his business as are his dollars.
4. Who will recognize the fact that I, as his employee, am his business partner.
5. Who will realize that my welfare is his welfare.
6. Who will realize that the best results of my best efforts can be produced only under the most advantageous conditions of his providing.
7. Who realizes that my best efforts will be the measure of his consideration, recognition and commendation.
8. Who is kind, considerate, respectful and courteous.
9. Who is firm but just.
10. Who is honest.

I will give my best efforts, skill and strength; my whole time and my unalloyed allegiance to such an employer.

QUERY ?

Are Such Demands:

1. Inconsistent with each other?
2. Inconsistent with individual development?
3. Inconsistent with industrial success?
4. Inconsistent with industrial peace?

By I. C. Parfitt, Johnstown, Penn.

Ideas and Suggestions

Efficient Mine Managers

By Pennsylvania Official

The efficient workman in any line must necessarily be skilled in the handling of the tools, material and equipment connected with his calling. The efficient mine official, therefore, must be skilled in the handling of men, as they are the material on the handling of which depends, to the greatest extent, his success or failure. The best results in the operation of any company, both as to safety and profit, can only be secured through the combined efforts of officers and employees.

We will all agree that no one individual excels in all lines of work, and also that nearly every man can do some one class of work best. Some favored few can do several jobs very well; these last may be called the handy men.

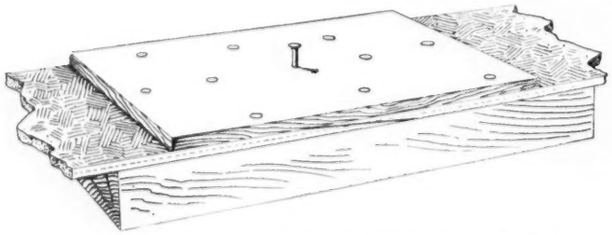
The official must study and know the material he has on hand in the way of good mechanics, motormen, machinemen, drivers, wiremen, bratticemen, timbermen, trackmen, entrymen, pillarmen, loaders and general handy men, in order to place them to the best possible advantage.

Engines, motors, mining machines, pumps, and even mules, all require placing to suit their individual capacities, but these are all handled by men; and the placing of the men, owing to their widely varying ability to do work, is by far the greatest problem of the mine official.

He who has acquired the knack of knowing and placing his available men to the best advantage, along with a good general knowledge of mining, is almost invariably successful.

Repairing or Splicing Belts

A number of articles have appeared from time to time on the subject of splicing belts, says a writer in *Power*, but I have used one kink that has not been mentioned and that may be of interest. It consists in simply placing a thick board under the joint and a thin one over it and nailing the two together, driving slender wire nails right through the belt and putting in enough of them to make sure that all parts of the joint are pressed

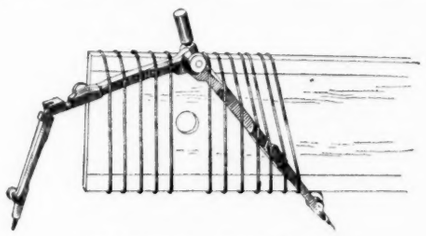


GLUED BELT BEING HELD WHILE DRYING

firmly together. If half-inch boards are used on top, sixpenny nails are large enough. The holes made do not injure the belt, and they disappear almost entirely after it has been in use a short time.

Drafting-Room Kink

The illustration shows how a compass and a T-square blade may be made to take the place of a beam compass, says **J. E.** Titus in *American Machinist*. The compass is spread as shown. The screw heads and



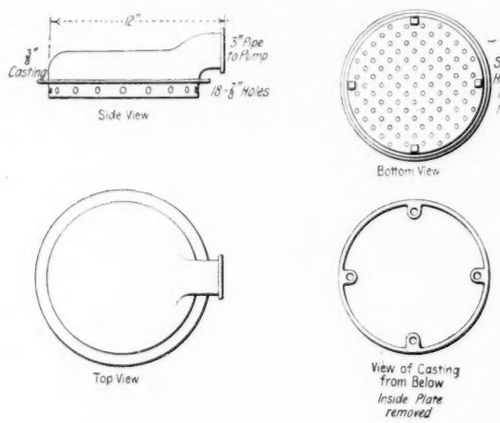
DRAFTING-ROOM KINK

the joint clamp catch against the edges of the blade and are wrapped into place. This arrangement is of advantage when a proper instrument is not at hand.

Strainer for Sinking Pumps

By J. F. K. Brown*

During the process of shaft sinking many of the troubles encountered arise from the sinking pumps and these troubles in turn are due to the strainers at the end of the suction pipe. The strainer may be too light and



DETAILS OF A SIMPLE AND PRACTICAL STRAINER

get crushed by falling material, or the holes may be too large, admitting much foreign matter and choking the pump.

The strainer illustrated herewith, the construction of which will be clearly understood from the drawing, possesses a number of features that may recommend it to those looking for such an article.

The design of the strainer allows the suction face to be always downward and in the water, even though that may be only a few inches in depth, while the weight and

*Sydney, N. S.

thickness of the metal will keep the strainer in position without the necessity of tying it in place. This also allows of rough usage and of a reasonable amount of material being placed on top of it without damage.

The outer suction plate is of a large area and serves to keep the larger pieces of material from coming against the inner plate. This inner plate in turn keeps out the smaller stuff. Chips of wood and material that floats, the worst variety for a pump, are always above the strainer of this suction, and there is no half-air-half-water draw. The bottom plate can be easily removed for cleaning without having to go to the trouble of removing the whole hosepiece.

Conducting Electric Power

By Robert Brown*

There is often among mine superintendents an overzealousness to reduce the cost of mining. The necessity of keeping the right kind of supplies on hand is overlooked, and what may at the time seem to be reducing cost may eventually add to it.

Suppose we take a glance, for instance, at the method of conducting the electric power to the mining machines, pumps, hoists, etc. In a possible majority of cases the power is conducted by extensions from the trolley wire, and in the branch entries it is used to run pumps, machines, etc.

Take, for example, a rock drill boring into hard rock. The power is being drawn from the trolley wire, and, when the locomotives are hauling heavy loads the power supplied to the rock drill would be low, and the rock-drill operator would be using all the power supplied. Should the motors come to a sudden stop, the result, owing to the influx of power, is liable to prove disastrous.

This condition naturally suggests that the power necessary for blasting purposes and to run all machinery (other than the locomotives) should be supplied from an insulated conductor independent of the trolley wire.

To thus provide an extra conductor might at first seem to be adding to the cost of production, but when we consider the irregular and oftentimes inadequate supply, remembering that short-circuits are not infrequent and accidents are likely to result from this irregular supply, we can see readily the advantage of adopting the separate conductors for all machinery other than the locomotives.

Another and very good reason why these separate conductors should be used is that the power should be cut off each branch entry when the locomotive is not in the entry (see Article 2, Section 3, of the Bituminous Mine Law of Pennsylvania), for by so doing accidents from this source will be reduced to a minimum.

I recall that when I was night foreman in one of the large Windber (Penn.) mines, a short-circuit that resulted from a fall of rock brought the trolley wire in contact with the rail, leaving the mine without power until the cause was located and the rock removed. Delays from these causes are (in a large mine) sometimes of long duration, especially at night, when the number of workmen is generally fewer than on the day shift.

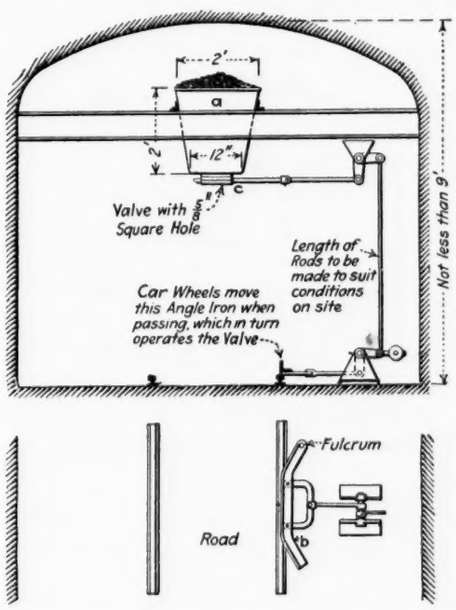
*Johnstown, Penn.

It will readily be seen that all delays, and perhaps many accidents resulting from this cause, will be reduced to a minimum by the use of an automatic section insulator on the trolley wire at the entrance to each branch heading. I would like to hear the opinions of *Coal Age* readers on this subject.

Rock-Dusting Mine Air

The air of the mine is continually filled with flying coal dust raised by passing cars. George Hann, a Welsh mining man, observed this fact and believed that it would be an excellent idea to make each car that went in or out of the workings distribute an antidote for the dust which it was industriously scattering, so he rigged up the apparatus illustrated herewith and described by G. D. Budge in a paper entitled "Notes on the Stone-Dusting of Steam-Coal Collieries" and read before the South Wales Institute of Engineers.

It will be seen that as the car passes a certain point in the track the wheels on one side push back an angle



ARRANGEMENT FOR ROCK-DUSTING ROADWAYS

iron which by means of two bell cranks opens a gate in a hopper containing rock dust. Each car, therefore, liberates an amount of dust dependent somewhat on the speed of its travel. However, as this does not vary much, the amount can be gaged with some accuracy. Mr. Hann provides 0.72 oz. of dust per car for a road on which 800 cars per day are passing.

In a mine so rock-dusted the air is as innocuous as the floor, roof and sides, though these have been immunized by the ordinary rock-dusting processes. Where it is not employed the air may contain dust which is as pure as that in a chunk of coal, though the dust on the floor may have a high percentage of ash.

This Department of "Ideas and Suggestions" is growing in interest and value. Many kinks are coming to us from "Coal Age" readers. Have you contributed something from your own experience?

Tenure of Coal Areas

By J. F. K. Brown*

SYNOPSIS—Four main systems for the acquisition of mineral lands have been developed, each with its particular merits and shortcomings. Where acquisition by outright purchase is followed, mining is more stable and more highly developed than elsewhere. Where "concessions" are granted, but little real progress can be made. The other two systems are intermediate between these two extremes.

In the acquiring and holding of coal lands a multiplicity of methods has arisen. Each has developed according to the needs and the requirements, fancied or otherwise, of the countries involved.

Fundamentally, each system is a variation of one of four main groups:

1. Acquisition under outright purchase, canceling any and all future claims.

2. Acquisition in the form of either leases or concessions based on payments of royalty without outright purchase.

3. Purchase from intermediaries without canceling royalty payments, and where the minerals cannot be alienated from the Government.

4. Purchase by the concession method, where mineral lands are sold by the Government, acting as an intermediary without abolishing royalties.

First System Insures Stability

The first, the oldest system, presents the unusual spectacle of being the most reliable and stable in practice, and at the same time the most reviled. Countries later in development, and with the procedure of older lands to guide them, seem to have acquired the habit of scorning the so-named, old-fashioned methods as exemplified in those lands where the coal industry is of long growth, and longer understanding. The common cry is denouncement on the charge of "unearned increment"; the crime of a landlordism levying a royalty on coal lands held by right of inheritance as against similar payments to the Government of the country.

Despite the fact that in certain countries the coals belong to the Government, and that there the taking up of coal lands should in theory be simplified, few, if any, operating companies acquire their holdings by such an easy road. More commonly large speculative interests step in between the Government and the buyers of coal land. This speculation has led to innumerable cases of over-capitalization and ridiculous financial transactions. The whole system provides opportunities for greater greed and grasping acquisition than were ever chargeable to the effect of landlordism in other lands.

Where such conditions have been allowed growth, the progress of a country cannot be otherwise than erratic. There are many spectacular successes, and as many spectacular failures—the successes are always with us, the failures we always forget. Again, too, the incidental expense in bringing the coal lands into operation is apt to become excessive, to such an extent as to largely be the cause of many of the failures—failures whose odium is borne by the credit of the country and charged against it.

Steady growth that eliminates speculation is preferable to any method that leads to loss of a country's credit. It is interesting to note that the largest coal-mining countries, and those that are most steadily progressive, those that hold a leading place in the world's coal trade, are the lands whose coal resources are exploited generally under a system belonging to or based on method No. 1 or 2.

Heavy competition among sellers of areas has perhaps something to do with the reasonable conditions under which properties are offered and acquired. The actual owner of coal lands is frequently more businesslike in his dealings with prospective customers than a Government that allows a third party to become responsible for the disposal of its coal areas.

For example, the proprietor of lands does not grant a mining company a lease, nor option for a lease, unless he is reasonably certain that the applicants are capable of carrying on actual operation; no "hold up" of the property is allowed; neither is an exorbitantly priced "option" required for the mere right to prove the area. Still more interesting is the fact that the area is not handed over to a third party for a mere nominal yearly sum with implied instructions and authority to make a sale at the highest possible figure. Where real, hard, "cash-down" mining is concerned—not the production of "holes in the ground with liars on the top"—if any such unreasonable demands were proposed or suspected, the prospective operator would go elsewhere, probably to the next-door owner, who perhaps would not be so foolish.

Under methods Nos. 1 and 2 operation is either on a royalty basis entirely, or the area is purchased outright, calculation of the price being based more or less on the value of the royalty over the life of the area. Purchase outright adds to the capital invested a large sum chargeable with interest, and consequently the actual purchase price when it is compared with leasing under royalty should include this additional cost. In those older lands where the words "inheritance" and "aristocracy" are common expressions of everyday life and conversation, the royalty system is largely developed, while other lands operate mainly on either method No. 1 or 3.

No Royalties To Consider

Where outright purchase is undertaken under system No. 1, the royalty is entirely disposed off, but under No. 3 this is not the case. The purchaser merely passes a lump sum in cash or its equivalent to some person who has been a little sharper than the mining company in acquiring mining rights. The Government royalty still remains due and payable. Generally, the net result is the payment of either a double royalty or the making of a double capitalization or its equivalent.

This implies that the profits of any coal company operating under such conditions must be about double what they need be under either royalty or outright purchase, and consequently in making investigation into the pos-

*Sydney, N. S.

sible success of coal mining where the double system is conducted, this fact is required to be kept in mind. It is always possible to pay dividends on any capital, provided the profits are large enough.

In theory, the idea underlying the adoption of methods carried out under system No. 3 is excellent; but in practice, such was the inability of human beings to foresee the future trend of events, it has degenerated into a "game of grab." Originally, the proposal was that actual operators only should lease from the Government direct, which in turn was expected to result in citizens of the country getting the benefit of moneys that otherwise would go into the land owner's pocket.

Actually these results are seldom attained, since the system not being properly safeguarded allows the entrance of a speculative middleman, whose sole claim to existence in many cases is his ability to get to the Mines Office or Department first. Any man may acquire the right to coal lands which he never intends to operate on the payment of a small annual sum for a more or less extensive period. During that time he endeavors to dispose of the property at an increase in price, which usually amounts to several thousand per cent. If he fails to sell, his brother or someone else takes up the area next year, and the process goes on.

On the other hand, if the original lessee is successful in selling to a concern with more money than brains—since corporations are gifted that way as well as men—a large sum is immediately added to the expense preliminary to operation, all of which leads in the end to excessive capitalization, and in many cases to other financial ills.

Balancing the Systems

It is interesting to make a little balance between the merits of the two systems on one average case. This shows the mining man clearly what points he has to bear in mind when investigating the purchase of areas where this speculative system is in vogue.

GENERAL DATA

Area of field	10 sq.mi.
Royalty	10c. per ton
Tonnage per square mile	4,800,000

	Direct Royalty	Purchase from Intermediaries
Price paid for property	Nil	$ 23,000 per sq.mi
Addition to capital	Nil	230,000
Total capital	$300,000	530,000
Annual tonnage	250,000	250,000
Profit per ton on equal basis	10c.	6.4c.
Actual royalty, per ton	10c.	13.6c.
Capital cost per annual ton	$1.20	$2.12
Percentage return on capital	8.3	3

From this comparison it appears that the project based on the assumed conditions would, if carried through under the direct royalty basis, provide a return that is reasonable and fair and commensurate with the risks of coal mining; while by purchase from a speculator, the return is much too low—a man can do better with his money in the bank, where it is safer, and more get-at-able.

These figures show that the mining engineer, investigating properties where purchase from intermediaries is necessary, should remember that more capital is required per ton of mineral in the ground, and he must see more profit in the operation. Further, a considerable proportion of that extra capital is bespoken and expended before the development of the mine is really a justification for the amount paid out. Almost invariably the seller of the areas requires payment on the entry of the coal company to the ground and before the area is even decently proved from actual operation to be a commercial success and the probable return on the capital accurately forecasted. Consequently, there is thereby added to coal mining an additional investment risk.

There cannot be any doubt but that this system has been the means of keeping capital out of many coal countries whose development today might have been greater and in better repute. The proportion, of money lost, over that successfully invested, must be great; and likewise, the reorganization and consequent adjustments of capital required after futile efforts to exist on original programs, must lead to loss. The follies of the system are many, and the virtues few. The worst feature is the liability of the system to blacken the credit of the country in the eyes of investors. Nothing sticks longer, and travels further, than the mere suspicion, justified or unjustified, that this or that country produces unprofitable mines. Capital is timid, and especially that speculative capital necessary to the early development of new districts.

Methods practiced under system No. 4 differ from those of No. 3, mainly in the translation of the words "legitimate sharpness" into "illegitimate rascality." In such lands the Government, or some officials connected with it, do the speculation on their own behalf with little heed to the ultimate success of the venture. The word "concession" is used to denote the sale of a Government mining right by some prominent official who has the "patronage," and while nominally the areas may be worth a certain fixed figure, practice sanctions asking the greatest sum that can be obtained legally or otherwise.

Again, while the sale may theoretically terminate the royalty, there is always cause for suspicion that it will not do so; success, meaning thereby profits of any description, being looked upon as a legitimate subject for further taxation, or other imposition. This creates a vexatious condition, carried sometimes to the extent of the Government acquiring again the same old property by act of parliament, or its equivalent, or by any figment of speech specially devised to meet the occasion. The state of society is such that the Government makes its money on the sale of the concessions, and not on any profits or royalties that might accrue from actual operation.

No Certainty of Tenure

It follows therefore that coal lands are, in such countries, objects of unstable tenure. Concessions may be purchased with all due form of legality, but there is no certainty about the holding of such areas—they may be sold twice over, in which case the party in power callously leaves the two purchasers to fight it out. Diplomatic power balanced by wholesale and continued bribery are the royal roads to holding mineral rights, while wholesale graft and repudiation of any contracts made when convenient are the keynotes of the general policy.

There is here, then, an unusual uncertainty about mining and a heavy expense that has to be shouldered by the mining company. It is not surprising to find that the countries where this system most prevails are those most backward of all in mineral development. The Turkish Empire forms a notable example, and some of the South American republics come very near to being in the same category. However, it is needful to remember that where

honorably carried through, system No. 4 is the equal of No. 3.

The price paid for coal areas and the royalties fixed thereon vary according to the position of the areas, the character of the coal and sometimes on local features that may be surmised or known about the workability of the field. Royalty figures vary all the way from 3c., to 12 and 25c. per ton. Each case has to be considered by itself, and all the conditions read together with those other factors that as a whole go to make the scheme presentable from the investor's standpoint.

Thus the country that has a royalty system amounting to about 14c. is quite probably so situated that the mining profit may be large enough to readily stand this charge. Conversely, the country offering a smaller royalty is possibly one where the profit is correspondingly small.

Purchase outright may also be at various prices, which are controlled by established conditions. One-half cent per ton of coal ranging up to 3c. follows the commonest range of values.

In certain countries the royalty is rated as a percentage of the selling price, and in others on the profit, but in the majority of cases it is a fixed amount per ton, irrespective of any circumstances that may be detrimental to operation or otherwise. In this respect the older system that frequently makes the royalty question a matter of adjustment between the two contracting parties is more equitable. There are such factors as thickness of the bed worked, the known existence of faulted areas, or the dirtyness of the coal and consequent production of much unmerchantable material. In those lands where the tonnage of coal reserves is described as "enormous," such details do not usually get attention, on the broad principle that thin coals and badly situated areas are not worth present attention.

Lease Length Should Equal Life of Area

Where areas are held under a lease basis, the principle clauses from the investigator's point of view are those concerning the length of the lease, approximating the life of the field, and the existence of cancellation clauses if any, and the reasons behind them. The first is a subject of calculation based on information already in the mind of the engineer conducting the investigation, and is comparatively simple, concerning itself with the safeguarding of the operating company to the extent of providing reasonable time for the return of capital with profits. But the second may contain all the "quirks" and "twists" imaginable, leading to much future trouble, and purely for want of proper wording be valueless in respect of allowing steady uninterrupted working.

Besides these two clauses, most leases draw attention to numbers of other points and conditions, each of which may be the result of special local circumstances.

What should be sought is equity on both sides, for wherever the area holder or the company retains the idea that the lease is a "gift of the Gods" for feathering their own particular nest, no settlement of terms will ever prove entirely satisfactory and workable. The aggrieved party to the bargain will be constantly trying to upset the agreement and obstruct the rights of the other.

This is one disadvantage of the second system of acquiring areas, because while it allows of settlement to meet certain disadvantageous conditions, it seldom follows any standard practice in doing so. It thus brings the final arrangement of the terms on which mining operations may begin to be almost a dominant factor in the outset, rather than the existence of coal workable or unworkable.

On the other hand, in those countries where the rights to mine are vested in the Government, the lease is commonly a simple standard instrument, the clauses of which are generally published and understandably so, in some Government publication, frequently the "Mines Act." In this case the investigator has the advantage of knowing before broaching the subject of a lease the conditions under which he will be called upon later to operate, and the bearing that each mentioned clause will have on future operations. Before going to the expense of the investigation, he can determine at a glance whether the conditions of holding the areas are such as to allow of profitable operation, other things being properly equal. Under the second system, however, he may quite readily make his investigation, and then have to sit down to much tedious negotiation with consequent expense, before obtaining the conditions that will allow of success.

Legal Advice Is Advantageous

The employment of a local law firm is a common-sense business precaution. It follows that there are, and must be, many "kinks" in the laws and regulations peculiar to each mining country that it would be absurd for the mining man to expect to master.

Not a few mining companies and investors neglect this common-sense precaution. They pay an engineer large sums to report on a coal property, and at the same time refuse him the power and expenses necessary to make full and proper inquiries on the question of tenure of the areas. If "pull" or "politics" is a useful asset, choose a law firm on the "right" side. A company starting to mine in a district wants all the help that it can get at the beginning, however much it may be able afterward to dictate to the politicians and wirepullers.

The extent to which this policy can be carried is dependent on the size of the enterprise to be started. Again, too, it is policy to consult a law firm not employed or retained by another operating company. You may not be given the gift of prophecy, but it is logical to presume that there may come a day when your interests and those of the older company might clash.

These little points, while they sound like a mere insistence on common sense, are worth drawing attention to afresh. Many mining engineers in the search for coal lands have condemned various properties, simply because the conditions of their purchase were unlike those they had become accustomed to elsewhere, or they recommended areas on the mining conditions only, and neglected to consider the business conditions connected with the enterprise.

Because one country does business by one method, it does not follow that there is only one way of carrying out the work elsewhere. Other lands and other peoples have developed methods suited to their own requirements. Our preference may be for one system or the other, but as long as the risks involved in each are carefully considered, pointed out, and clearly understood, an enterprise under any particular system stands an equal chance of success, other knowledge and data being equal.

Design for Auxiliary Shaft

By O. J. Pleschner*

SYNOPSIS—At large mines an auxiliary hoist shaft possesses distinct advantages. In the usual design of such shafts and shaft bottoms, it is necessary to lead the air through a detour around the passages leading to the other shaft compartments. The design here shown obviates this necessity.

With the ever-increasing tonnage of the newer coal-mining plants comes the necessity for careful and efficient engineering in the design of the plants from every angle. Most of the earlier efficiency engineering at mines lost sight of the fact that a great improvement could be effected by the use of auxiliary shafts. These are combinations of a secondary hoist shaft, a main air shaft, and a manway.

There are several advantages to having a secondary hoist at the auxiliary shaft. Among these are: (1) Timber and material can be taken down and distributed during the day shift; (2) men can be hoisted and lowered at both shafts at the beginning and end of the shifts, expediting this part of the daily routine in no small degree; (3) should an accident occur to the cages in the main shaft, quick transportation of men and materials can be had in the secondary shaft. All mine foremen know that even in the best regulated mines accidents will occasionally happen, and tools and material that could be used in repair work are seldom at hand where needed.

The three compartments of the auxiliary shaft are usually placed side by side and make a rather awkward group from which the air must be conducted to the two main airways. This is especially true where the shaft-bottom plan shown in Fig. 1 is used.

In designing the shaft shown in plan in Fig. 2, the main idea was to eliminate the necessity for the air mak-

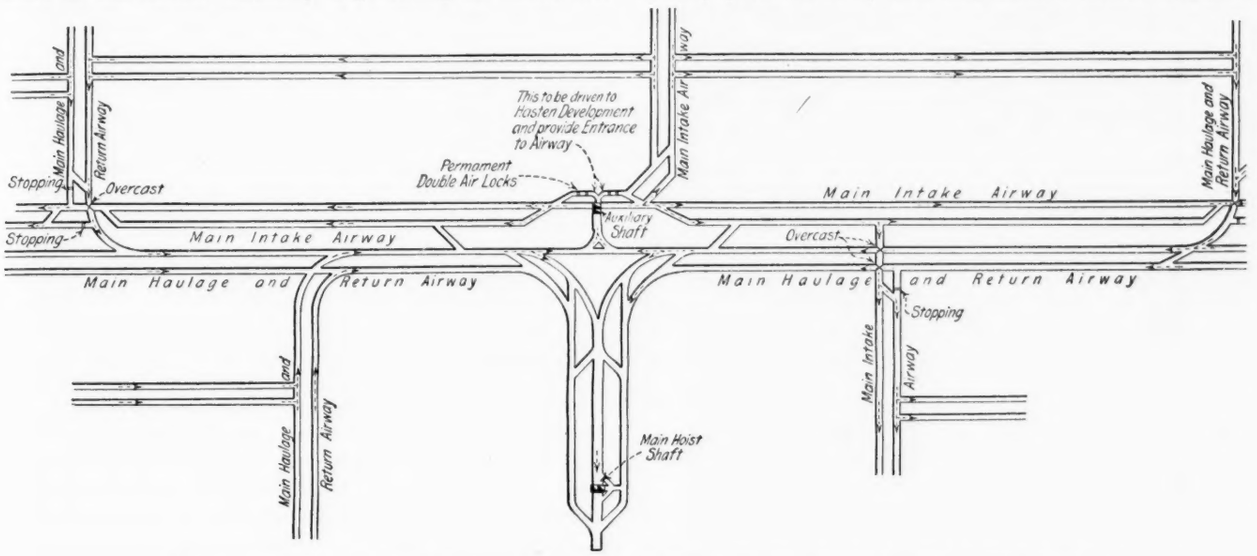


FIG. 1. LAYOUT OF DEVELOPMENT NEAR MAIN AND AUXILIARY SHAFT BOTTOMS

*Danville, Ill.

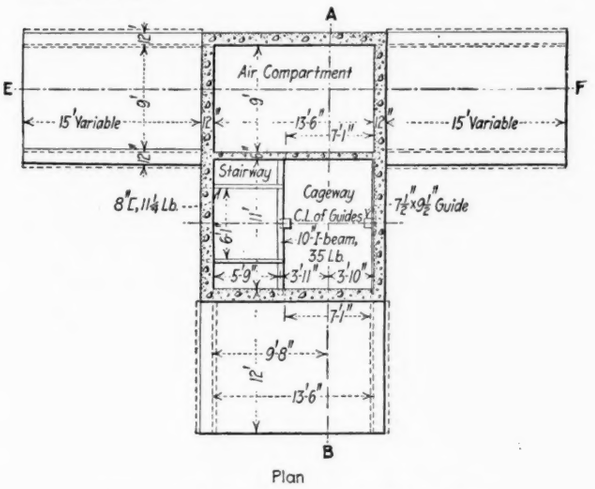


FIG. 2. PLAN OF AUXILIARY SHAFT

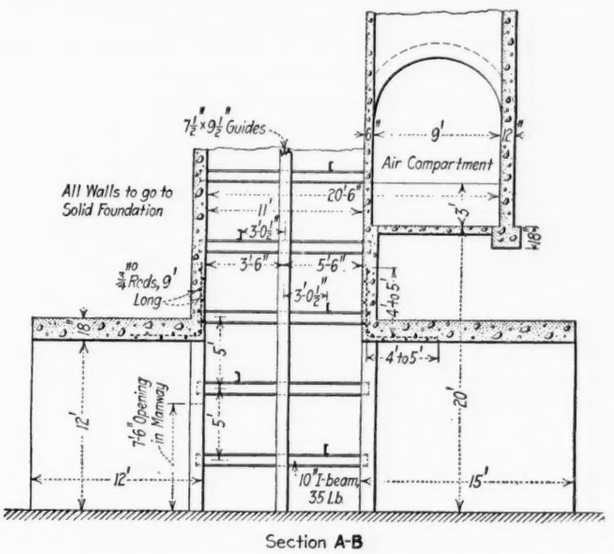


FIG. 3. SECTION THROUGH SHAFT FOOT

ing a detour around the other two shaft compartments and still allow the entries at the auxiliary shaft to be developed from the secondary hoist, which should accommodate the same cars and rolling equipment as the main hoist. Eliminating the detour of the air removes at least one 90 deg. bend, or turn, at the point where such elimination is the most desirable; namely, where the velocity of the air current is necessarily high.

In the section shown in Fig. 3 the air compartment in the shaft is stopped 20 ft. (this distance is variable) above the bottom of the hoist and stairway compartments. The airways then branch off on a slope to either side, to the main airways. The stopping of the air compartment higher up allows the driving of the developing entries on that side of the hoistway. These entries also serve the purpose of providing a cagingway on both sides of the hoist and afford a convenient entrance to the bottom of the air shaft. With double air locks properly built no air need be lost.

Should the strata be unsafe and 20 ft. be too close to the entry arch below, the air compartment should be stopped 25 or 30 ft. up. In good strata the arches in the slopes may be omitted, thus decreasing the cost.

Fig. 4 is a cross-section showing the relation of the air and the hoist compartment. In all the drawings it will be noted that strict compliance has been made with the Illinois state mining laws, which require that no wood

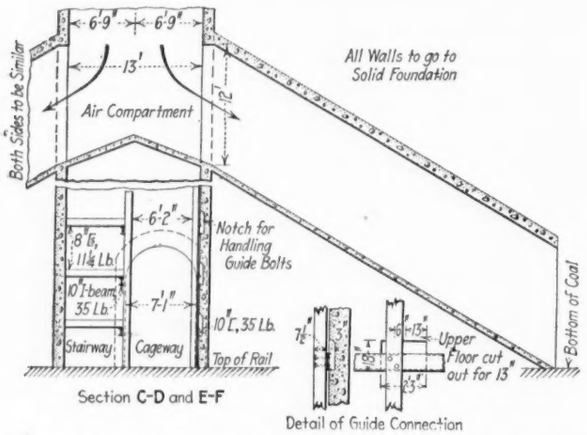


FIG. 4. SECTION THROUGH FOOT OF AIR COMPARTMENT

except guides be exposed in the shaft. Though no stair treads are shown, steel stairways should be erected. The drawing also shows the detail of the method for fastening the guide onto the concrete wall. This is accomplished by bolting the guide to 10-in. channel beams spaced on 5-ft. centers and serving as buntons. A small pocket is left in the concrete just large enough for a man's arm and wrench to be used in holding the nut while the bolt is being turned from the outside. Two bolts at each channel should be used for guides of the size shown.

Referring again to Fig. 1, here is shown the general layout of the shaft bottom to which this design of shaft is best adapted. This bottom layout has been tried and found to give efficient results in some of the larger mines in Illinois.

Only a few crosscuts are shown on the drawing, as it is understood they must be driven according to the state law, or as otherwise required. No distances are shown on this plan, for the reason that each installation must be adapted to suit local conditions.

Packing and Bratticing

At the monthly meeting of the Pittston (Penn.) Mining Institute, Nov. 20, David Girvan presiding, John Lloyd, efficiency engineer of the Lehigh Valley Coal Co., read a paper on "Packing," and said that engines and pumps could often be better packed by using a smaller quantity of packing than is now in use. James A. Gardner, of the Pennsylvania Coal Co., gave a talk on "The Duty of a Miner."

This was followed by a discussion between the advocates of brattice cloth and boards. John E. Reynolds, inside foreman for the Lehigh Valley Coal Co., advocated strongly the use of boards, especially in gaseous mine workings. William Lancaster, of Austin Heights, also spoke in favor of their use. Both declared that the board brattices they favored were close fitting and not, as they termed, the loose variety, mere "picket fences."

The chairman said a few words in favor of incombustible cloth for bratticing, and Richard Williams strongly urged the use of brattice cloth in place of boards for that purpose. He said that it was more economical and just as efficient, and that cloth is peculiarly adaptable for conditions near the face of a chamber because a cloth brattice can readily be taken down before shots are fired and replaced as soon as the air current has cleared away the smoke. The question is to be further discussed at the next meeting.

Recollections of a Manager

One of the first things that impressed me after I took charge of the company's affairs as manager, was the absurdity of its published statement of available tonnage in mineral reserves contained in the annual report of the board of directors over the signature of my predecessor.

Satisfying myself that no dependence could be placed on the published estimates, I took the matter up with the board at its next meeting, requesting that an appropriation be made to cover systematic and adequate drilling in the areas where no accurate data as to thickness of seams were available.

The chairman of the executive committee was on his feet in an instant, wanting to know why I was so much concerned with a report that did not affect me in the least. I replied that the report carried the signature of the company's manager, and if I was expected to sign a similar statement the following year, much of the data would have to be omitted.

That threw the question open to discussion.

I learned that not one of the directors had a desire to mislead the stockholders, but inasmuch as the tonnage estimates for the undeveloped lands as carried on the books had been accepted without question ever since the company had been organized, they hesitated about digging into them now because they felt that nothing could be gained if it were found that the estimates were too small; and if they were too large it would be difficult if not impossible after all these years to make a satisfactory explanation.

The matter was not mentioned again until at the close of the fiscal year. When I was asked to sign the report, I insisted upon adding the word "approximate" to several of the statements; as no one objected, the incident passed without discussion.

In the course of a few years the company required additional tonnage, and a new mine became a necessity. We decided upon a shaft almost midway between two drift mines that had been in operation a number of years. The coal seam had shown no variation in thickness in any of the drifts, and no faults had been encountered. We assumed, without giving the matter more than a passing thought, that it would be safe to go ahead with the new mine without doing any drilling.

In less than a year's time from the beginning of operations at the new shaft, we found it necessary to abandon it because two parallel faults were encountered, one on either side of the shaft, which made the operation unprofitable.

All the equipment was transferred to another mine, but even with that the company auditor reported a total loss from the adventure of over $200,000 before the account was finally closed on his books.

At the end of that fiscal year it became necessary to make an explanation concerning the abandonment of the mine, as my report for the previous year had called attention to the new mine and the tonnage that it was expected to produce. I wrote out a simple statement covering all the facts, taking unto myself all the blame, and submitted it to the board of directors for approval at our next meeting.

When the secretary came to the words "for want of sufficient prospecting," the meeting was thrown into confusion. Every director recalled how I had objected to accepting the mineral reserve estimates without actual drill records as a basis, and they seemed to fear that my latest report was intended as a fling at them.

Instead of reflecting upon my ability, the abandoned shaft actually served to increase my reputation as an engineer.

Who's Who In Coal Mining

Morris Williams Bush

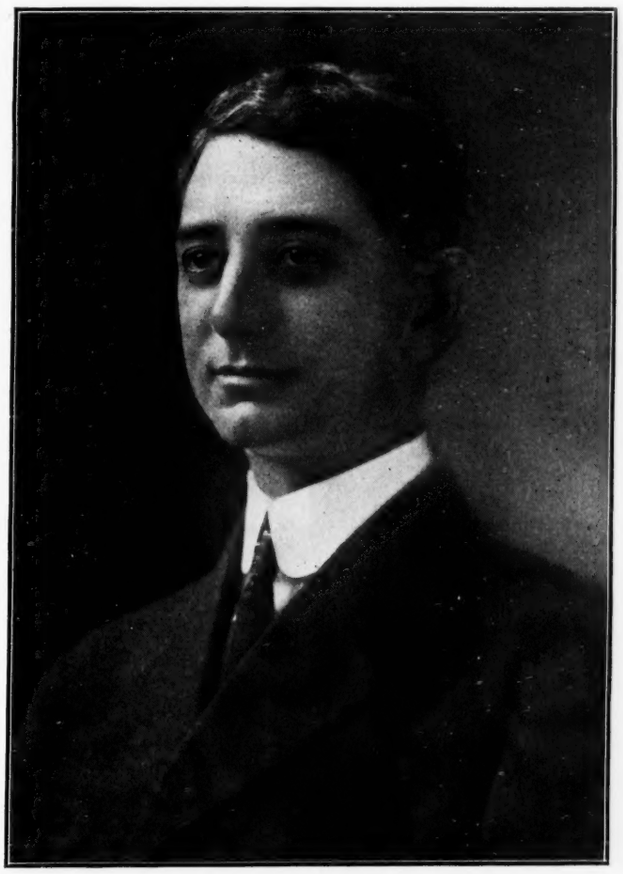
It is in the Southern and Western coal fields that the careers of the younger men in the industry stand out most prominently. The mining developments in these newer districts are more recent than in the older Eastern fields, and as a consequence the talents of the younger generation in the mining business have a broader field of opportunity.

The younger men in Alabama are doing big things, and none of them is accomplishing more in a mining way than Morris Bush, president of the Imperial Coal and Coke Co. Mr. Bush is a native of the South, having been born in Mobile, Ala., in 1880. He graduated from Vanderbilt University in 1899 with a B.A. degree.

His first important work was as general superintendent of the Alabama Consolidated Coal and Iron Co., which position he occupied from 1901 to 1907. He designed and built two Gadsden furnaces of the above company, and was in general charge of all operations of blast furnaces, coal and ore mines and coke ovens. In 1907 Mr. Bush was made general superintendent of the Woodward Iron Co., holding this office until 1914. While in the employ of the Woodward company he built two blast furnaces and also erected some Koppers byproduct coke ovens.

In 1914 Mr. Bush became president of the Shelly Iron Co., and in 1915 he was made president of the Majestic Coal Co. He still fills both of these positions, and in addition is president of the Coosa Pipe and Foundry Co. and the Imperial Coal and Coke Co.

Practically all the mines of the foregoing companies are located within 20 mi. of Birmingham, on the celebrated "Black Creek" seam. This coal runs 2½ per cent. in ash, is very low in sulphur and has a heat value of better than 15,000 B.t.u. The product from this bed is used for gas, steam, blacksmith and coking purposes. The Shelly Iron Co. has been in continuous operation since 1846 and makes a high-grade warm blast



M. W. BUSH
Prominent in Alabama's Coal Industry

charcoal iron. The Coosa Pipe and Foundry Co. is one of the largest manufacturers in the South of cast-iron soil pipe and fittings.

Mr. Bush is a director in the American Trust and Savings Bank of Birmingham. He was recently elected president of the Birmingham Chamber of Commerce. His clubs are the Southern, the Country and the Roebuck, all of Birmingham. He is a member of the American Institute of Mining Engineers and the American Iron and Steel Institute. Few men in Alabama irrespective of their age and experience rank higher in the coal and iron circles of the state than does Morris Bush.

After 48 Hr. in Storage Powdered Coal Packs Hard—Owing to the hygroscopic nature of dried powdered coal, long storage is not desirable. In its normal state powdered coal is light and fluffy; after 48 hr. standing in storage, however, the physical arrangement of the particles produces a dense packed mass. So dense does the fuel become, that one's fingers cannot make an impression even ½ in. deep. To secure ideal conditions powdered coal should be kept in motion.—C. J. Gadd, Journal of the Franklin Institute, September, 1916.

Cap Lamp with New Features

SYNOPSIS—A lamp with a straight filament which passes horizontally athwart the reflector. The battery case is either of drawn steel or of an aluminum alloy. Special precautions are taken to prevent the deterioration of the connecting cable.

The most natural way to place an electric lamp bulb in a miner's cap is with the socket toward his head, but in a new cap lamp just approved by the United States Bureau of Mines the bulb has a double socket between which a single straight filament passes. This filament is placed, not radially to the head of the miner, but tangentially, so that the observer sees a horizontal line and not a point of light.

The cap lamp shell is steel, lined with fiber insulation. It contains a reflector of porcelain-enameled steel and has phosphor-bronze spring contacts rigidly mounted.

NEW CAP LAMP ASSEMBLED

The lamp is a ½-cp. wire-drawn Mazda with a guaranteed life of 300 hr. With the reflector it produces a well diffused illumination over a spherical angle of 130 deg. The lamp is waterproof and weighs about 4 oz. The weight on the cap is somewhat more, as the cable connections are added. It will run from 6 to 8 oz. depending on the manner in which the lamp and cable are worn. Double steel hooks electrically welded together and riveted to the shell provide means for attaching the lamp to the miner's cap.

A 43-in. cable connects the lamp to the battery. This length is ample and permits the unrestricted movement of the workman. The cable consists of two strands of copper, rubber-coated and twisted. The cable thus formed is also covered with rubber, and the combination is therefore thoroughly impervious to moisture and mine water. It weighs about 8 oz. and is strong, light, flexible, and nonkinking. It has a low electrical resistance.

Protection at each end is afforded by steel spring armor, double at the battery and single at the lamp. The cable is fastened to the bushings by which it enters the lamp and battery by rubber packings secured with locknuts. It will stand a heavy pull without loosening or putting undue stress on the terminals of the conductor.

The battery may be either of drawn and folded sheet steel or of an aluminum alloy. In the latter instance it is a casting ⅛ in. thick, the alloy used being 91 per cent. pure aluminum. The drawn sheet steel battery box is of two pieces of folded metal electrically welded. It has horizontal corrugations in the front and the cover is of aluminum cast in one piece, the entrance bushing and hinge pin being part of the casting.

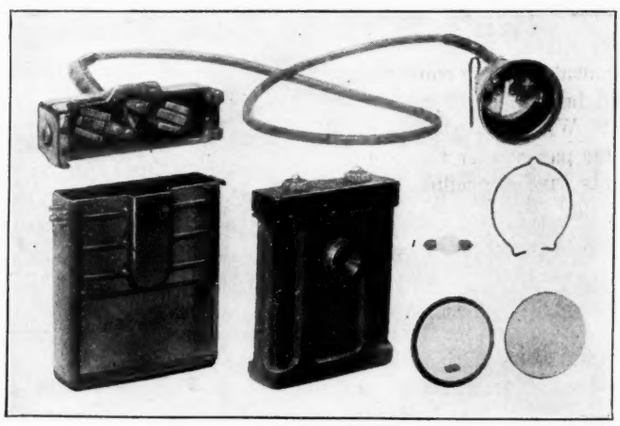
When the cover is closed spring contacts of phosphor bronze on the inside engage the terminal studs of the battery with three points of contact for each stud. Thus perfect contact is secured with maximum contact surface. These contacts are mounted on insulating blocks of fiber which are riveted to the cover and which exert a constant pressure on the studs, preventing loose contact and any rattling of the battery in the case.

The cover is simple, rugged and self-acting and has a double latchlock which locks with a key. Any tampering with the lock can readily be detected.

The aluminum battery case is a single piece; even the hinge slot, the straps, by which the belt that supports the battery is attached and the parts that are engaged by the lock are cast integral with the case itself. Otherwise the aluminum case is identical with that made of steel.

To make the metal parts acid proof they are coated with a semi-transparent acid-proof baking varnish which gives a serviceable gray finish.

The battery is of the "iron-clad exide" type, with an iron-clad positive plate and "exide" negative plate. It is guaranteed to give service for not less than 10¾ hr.



INTEGRAL PARTS OF THE LAMP

per charge throughout a period of two years. The plates are contained in a nonspillable case made of rubber of medium hardness. They are ribbed vertically in order to give them strength, and are sealed with a special vent and filling plug. The cover is so constructed that the pressure of the contacts on the terminals strengthens the seal. All parts of the entire outfit are interchangeable. No gas is generated on discharge; therefore the battery can not cause explosions.

Automatic charging racks, of course, are not part of the equipment covered by the approval of the Bureau of Mines, but they can be furnished with the lamps.

Each battery space on the charging board is provided with the proper resistance unit, so that regardless of the number of batteries being charged the proper current is automatically maintained. The phosphor-bronze spring contacts are of such form and arrangement that no battery can be inserted incorrectly. The proper polarity is absolutely necessary to secure contact. A single motion of the hand places the battery on the charging board and automatically cuts it into the charging circuit.

The advantages of the outfit are summed up as follows: Ignition of mine gas is impossible; neither battery nor lamps can be short-circuited. The battery gives a full, steady illumination for the entire shift. Failures except as the result of accident are impossible. The equipment will operate when submerged in water and is safe, durable, efficient and easy to wear. The light cannot be extinguished except by intentional disabling. The outfit may be sealed so that any tampering with the lock will be rendered visible.

These lamps are manufactured by the General Electric Co., of Schenectady, N. Y., under approvals 13 and 13A of the United States Bureau of Mines. They meet with the requirements of schedule 6A, which is prepared for the purpose of testing the safety, practicability and efficiency of electric safety lamps in general service.

Results of German Institute for Coal Research*

Shortly before the war, the Kaiser-Wilhelm Institute for Coal Research was opened at Mülheim-on-the-Ruhr. From a report of its work the *Schweizerische Bauzeitung* gleans the following facts:

1. By leaching ordinary coal at natural temperatures with liquid sulphurous acid, about 5 grams of viscous, aromatic golden-yellow mineral oils can be obtained per kilogram of mineral treated. By using benzol under pressure, more than 60 grams may be extracted, but only a small part of this product consists of oil. With the removal of these constituents the coal loses its consistency and falls to powder.

2. When the coal is distilled with superheated steam, a tar passes over that contains optically active oils, lubricants and paraffin, substances similar to those now obtained from petroleum.

3. By treatment with ozone, over 92 per cent. of the coal can be changed into a brown mass, with an odor like that of caramel, and soluble in water. The composition of this substance is still unknown.

4. By a new method, about 20 per cent. of ozokerite can be obtained from lignite, as against 12 per cent. hitherto.

For a better understanding of this report K. Arndt, in the *Elektrotechnische Zeitschrift,* points out that as far back as 1836 the Freiburg chemist Lampadius, who proposed to use caking coal for briquetting dusty ores, was able with carbon bisulphide to extract 4 to 5 per cent. of the coal by weight. The resulting dark-brown resinous mass was completely fluid at 158 deg. F. After the extraction the coal no longer caked.

Subsequently, other experiments using chloroform, pyridine and benzol under high pressure have been used to extract substances from coal, the quantities of which have often been quite large. These extracts have been but little studied.

The solid, liquid and gaseous matters separating from coal at temperatures that are not high—480 to 840 deg. F.—were investigated in 1906 by Börnstein, at the instance of Bunte. These substances, which are not obtained at the high temperatures of ordinary coal distillation—over 1,800 deg. F.—still offer to the chemist a rich field for difficult but profitable research.

It has long been known that coal treated with oxidizing reagents, such as permanganate of potash, can be changed into certain brown soluble substances—for example, mellitic acid, $C_{12}H_6O_{12}$. It is to be hoped that the use of ozone, by which Harries has shown how to synthesize the rubber molecule, will also lead to new discoveries in coal research. Finally, it appears from a publication of Franz Fischer, director of the institute, that he has been able to change about one-third part of naphthalene into another fluid rich in hydrogen, by heating it under pressure in the presence of aluminum chloride.

It is as yet difficult to judge the practical value of these results. Arndt thinks that we would do well not to underestimate the difficulties yet to be overcome.

*Translated specially for "Coal Age."

No Cars

A coal man went to Heaven one day
(As coal men sometimes do),
And they gave him a job, with princely pay,
Of running a coal train through
To the Kingdom of Hell, with instructions to haul
From the fiery brimstone bars
All the railroad men whom he could recall;
But they gave him, alas, no cars.

So a message he sent to the realms of Hell
For the railroad men to be
On the watch for his train, and he rang the bell
With a chuckle of fiendish glee.
And the men lined up as they writhed in pain
On the fiery brimstone bars.
But when the coal man showed up with his train,
My God, he had no cars!

And so through endless cycles of years,
The railroad men line up,
With hope dispelled, with groans and tears,
As they drain the bitter cup.
The coal man he makes his run on time,
From the pearly gates to the fiery bars;
While the railroad men in anguish chime:
"My God, my God, no cars!"

COMING MEETINGS

The West Virginia Coal Mining Institute will hold its winter meeting Dec. 12 and 13, 1916, at the Hotel Frederick, Huntington, W. Va. Secretary, E. N. Zern, Morgantown, W. Va.

International Association of Industrial Accident Boards and Commissions will hold its first meeting at the Hotel Raleigh, Washington, D. C., Dec. 5-9. Royal Meeker, secretary-treasurer, United States Commissioner of Labor Statistics, Washington, D. C.

The American Society of Mechanical Engineers will hold its annual meeting Dec. 5-8, 1916, at the Engineering Societies Building, New York City. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

The Brownsville, Penn., Mining Institute will hold meetings on the first and third Friday of each month at 7:30 p.m. Secretary, G. E. Daugherty, South Brownsville, Penn.

Kentucky Mining Institute will hold its winter meeting on Dec. 8 and 9, 1916, at Seelbach Hotel, Louisville, Ky. Secretary, Ivan P. Tashof, 437 21st St., S. E., Washington, D. C.

The Coal Mining Institute of America will hold its annual meeting on Wednesday, Thursday and Friday, Dec. 6, 7 and 8, 1916, at the Fort Pitt Hotel, Pittsburgh, Penn. Acting Secretary, S. B. Smith, Pittsburgh, Penn.

Gaseous Mines in the Crow's Nest Pass Coal Field

By Thomas Graham*

SYNOPSIS—General description of the Crow's Nest Pass coal field and its principal collieries. An interesting account of the terrible outbursts of gas that marked the working of the Morrisey colliery. Working of the gas in the strata causes ominous sounds the miners call "bumps." System of taking samples of the mine air and results of the analyses made by the Canadian Government—Michel colliery.

The Crow's Nest Pass coal field is situated in the southeastern portion of the Province of British Columbia.

The coal field lies immediately to the west of the summit of the Rocky Mountains. In shape, the basin is described by James McEvoy, mining geologist, as a long-pointed triangle, with its base to the south, the area containing coal being approximately 230 sq.mi. Its greatest length is about 35 mi. north and south and its greatest width about 13 mi.

The coal seams are in the Cretaceous measures, and a section of these, measured by Mr. McEvoy, at Morrisey, near the southern end of the field, shows a thickness of nearly 5,000 ft. and contains 200 ft. of coal. This coal occurs in about 2,000 ft. of the measures and, making allowance for impure coal and seams less than three feet in thickness, it is estimated that the workable coal in the field is 100 ft.

The field is reached by two railways, the Crow's Nest Pass branch of the Canadian Pacific Ry. enters the field from the east through the Crow's Nest Pass, follows down Michel Creek and crosses the northern part of the coal area, and then follows the valley of the Elk River, along the western side of the coal area for nearly 25 mi. The Great Northern Ry. enters the field by a branch which leaves the main line at Rexford, Mont., and reaches the southern end of the field near Morrisey, parallels the Canadian Pacific Ry. in the Elk Valley through Fernie, Hosmer, Olsen and Sparwood, and thence up Michel Creek to Michel. The upturned western edge of the coal-bearing series forms a ridge paralleling the Elk River and a few miles distant from it. The height of the ridge being about 3,500 or 4,000 ft. above the river, the coal seams outcrop about half way up this ridge and pitch eastward.

The field was first opened in 1897 at Coal Creek, a tributary of the Elk River, about 5 mi. east of Fernie, which is now the principal city in the field and, since that time, openings have been made at Morrisey, Michel, Hosmer and Corbin.

Morrisey Colliery

This colliery is near the southern end of the field. Operations were commenced in 1901 but, owing to inability to cope with the outbursts of gas, were finally abandoned in 1909. In the No. 1 mine an outburst occurred Aug. 6, 1903. The seam is irregular, varying from 14 to 40 ft. in thickness, with a strong roof and floor. Three openings had been made on the seam, two being intakes and one a return. The levels had been driven about 2,000 ft. and were carried in the upper 10 ft. of the seam. About 60,000 cu.ft. of air per min. was in circulation in the mine, at the time, the water gage being about ¾ of an inch.

This outburst occurred in a crosscut between the center and the upper level. The men had warning of the movement, but the outburst occurred before they reached the outside of the mine. The escaping gases reversed the ventilation and fine coal and dust was blown out of the mine mouth. Four days elapsed before the mine could be reëntered. An examination showed that much fine coal had been blown into the main level and 1,456 tons of "fines" were removed before the original face was reached. Here a cavity was found 8x10x110 ft., extending beyond the original line of face.

Other Frequent Outbursts of Gas Lead to the Abandonment of the Mine

Another outburst occurred Oct. 14, 1904, in which four men were smothered in the fine coal discharged; but this outburst was less violent than the one in August of the preceding year, less gas being given off and only about 800 tons of coal displaced.

Still another large outburst of gas occurred Nov. 18, 1904, in which 14 men were smothered. A huge cloud of coal dust shot out of the mine mouth. This was so fine that it was described by eyewitnesses as smoke. The outburst occurred at the face of the center one of the three main levels. For half an hour after the outburst occurred all three openings were emitting gas in such quantities that they could not be approached. The volume of air in circulation was 57,000 cu.ft. per min. The fan never stopped and the self-recording water gage showed no change in pressure. The displacement of coal in this outburst was estimated by the management as 3,500 tons. The volume of gas given off in the first 30 min. after the outburst was estimated by various authorities at from 2,000,000 to 5,000,000 cu.ft.

The colliery was then closed down for a few years, but in 1907 work was resumed, and several openings made on other seams. But, again, an outburst occurred, Jan. 27, 1909, at the face of the main level in No. 7 mine. This filled the level with coal for a distance of 15 ft. and 15 min. later gas was issuing from the mouth of the mine in such quantities that the flame of a safety lamp was extinguished in the free atmosphere, 30 ft. outside the entrance of the tunnel.

This occurrence was followed, May 5, the same year, by a smaller outburst at the face of the main tunnel in No. 7 mine, which caused the death of two men, who were suffocated by the fine coal displaced. In this instance, the gas only filled the level for a distance of a few hundred feet. Two weeks later, May 19, another outburst took place only 14 ft. in advance of the place of the previous one, but fortunately no lives were lost; although the displaced coal left a cavity about 8 ft. in diameter

*Chief Inspector of Mines for the Province of British Columbia, Victoria, B. C. Proceedings Mine Inspector's Institute, Joplin meeting, June 13-15, 1916.

and 25 ft. in depth, and gas issued from the mine mouth for a period of 6 hr. after the outburst. The colliery was then abandoned and no attempt has since been made to reopen it.

Peculiar Phenomena of the Crow's Nest Pass Coal Field

The term "bumps" is a somewhat local expression used to describe the ominous sounds that betoken the movements of the strata overlying the several seams operated in the Crow's Nest Pass coal field. These "bumps," although usually accompanied by more or less heavy discharges of gas, are not in the nature of the outbursts of gas and coal I have just described. The Coal Creek colliery has been the seat of most of the "bumps," which are sufficiently severe to shake the houses in the village and, at times, cars and other movable materials are displaced in the mine. The colliery is situated in the narrow valley through which the waters of Coal Creek run. This valley is about 1,000 ft. in width, the mountains on each side rising to a height of about 2,500 ft. above the level of the creek, at the mine.

The superincumbent strata overlying the present operations on the south side of the creek do not exceed 1,400 ft. vertical elevation; but as the measures have been cut through the creek valley, in many instances by lateral gulches at right angles to the valley, the overlying strata are frequently exposed on several sides, thus throwing an enormous thrust upon the supporting pillars in the mine. A large proportion of the "bumps" have occurred in the area worked by No. 2 mine, lying on the south side of the creek, which was one of the first mines opened in that field.

Effect Produced in the Mine Roadways

The "bumps" are usually accompanied by an upheaval of the floor in the vicinity. In many instances, for several hundred feet in a roadway averaging 6 ft. in height, the floor would be thrown almost against the roof by the gas given off from the soft shale floor and by the pressure brought on the surrounding pillars. The "bumps" were most severe in 1907 and 1908, when it became necessary to restrict operations in certain areas in the mine. New openings are now being made to win the coal from the territory lying beyond the restricted area in No. 2 seam. The mode of operation will be by pillar and stall, similar to the operations that have been conducted over this restricted area, in an overlying seam 100 ft. above No. 2, which has been opened by a mine known as No. 1 East now producing 1,500 tons of coal a day.

Since operations were conducted along these lines the "bumps" have been fewer in number, and are confined largely to the area covered by the old workings in No. 2 mine. Recently, while accompanied by considerable earth tremor, they have not caused any damage or large effusions of gas in the No. 1 East mine. My object here is not to deal with sudden outbursts of gas or "bumps," but rather with the general emanations of methane from the seams of this particular field, though it seemed essential to refer to these now well-known occurrences.

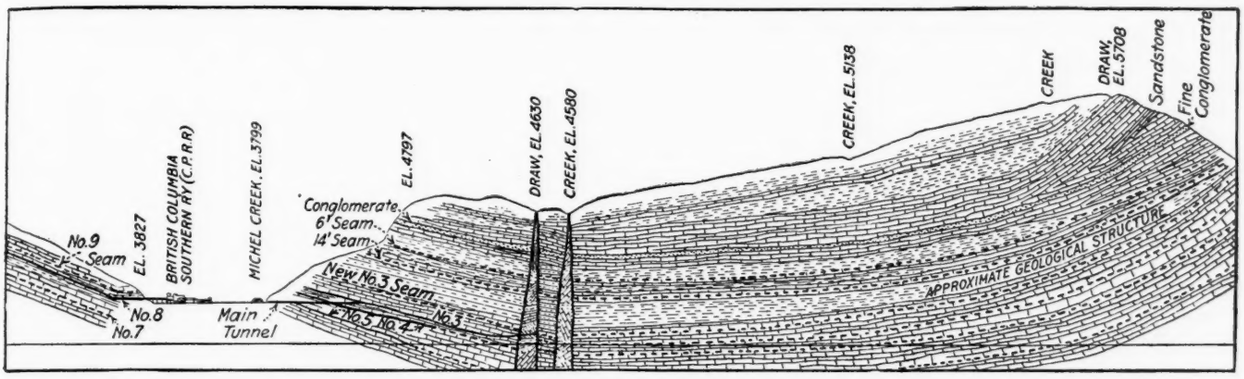


FIG. 1. SECTION SHOWING ARRANGEMENT OF COAL MEASURES AT MICHEL, B. C.
Scale—530 ft. = 1 in.

Several attempts have been made at both the Coal Creek and Michel collieries to operate some of the smaller seams on the longwall basis, but for some reason or another this mode of working has always been abandoned, which is unfortunate, as several of the seams are well suited to longwall operations. The longwall method would provide easier and more perfect ventilation in seams giving off gas as freely as is the case in these collieries. However, the present method of operation is all on the pillar-and-stall plan.

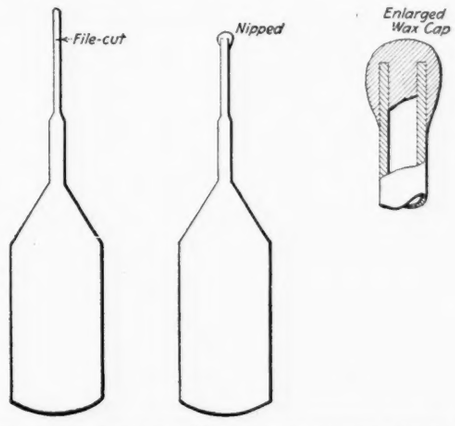


FIG. 2. DIAGRAM SHOWING VACUUM BOTTLES USED TO COLLECT SAMPLES OF MINE AIR

Early in 1915 the Department of Mines of the Dominion Government at Ottawa undertook the work of analyzing samples of mine air taken from the mines in the various Provinces of Canada. The mode of collecting these samples of air is by means of vacuum bottles, from which the air had been previously exhausted. These bottles were provided with a long slender neck, which was

tightly sealed when the air had been exhausted. The seal was broken by a file as shown in Fig. 2, at the place where the sample was taken, after which the neck of the bottle was sealed with wax as shown on the right of the figure. The Federal Mines Department furnished the bottles and made the analyses free of any charge to the Provinces. Advantage of this offer was taken by the Mines Department of the Province of British Columbia, in the hope of obtaining valuable data on the emanations of methane from the Michel and Coal Creek mines, which had long been known to be of a very gaseous nature.

Michel Colliery

This colliery is situated about the center of the trough or basin, near the northern end of the coal field. Seven seams have been operated at this colliery—No. 9, 10 ft.; No. 8, 12 ft.; No. 7, 11 ft.; No. 5, 7 ft.; No. 4, 7 ft.; No. 3, 5 ft., and the new No. 3 seam, 11 ft. in average thickness.

Only three of these seams are being worked at the present time; namely, No. 8 seam, on the north side; No. 3 and No. 3 East, on the south side. The coals are bituminous in character and make an excellent coke, without washing, in ovens of the beehive type.

TABLE 1. MICHEL COLLIERY

No. 8 Mine

Sample No.	Date	Where Taken on Return	Average Daily Production in Tons	No. of Men in Mine per 24 Hr.	Volume of Air in Circulation (Cu.Ft. p. Min.)	Per Cent. of Methane in Air	Volume of Methane: Cu.Ft. per Min.	Volume of Methane: Cu.Ft. per Ton of Coal Mined
22	Oct. 28, '15	East-Side	300	...	12,000	0.13	15	75
23	Oct. 28, '15	West-Side	180	...	13,000	0.10	13	104
24	Oct. 28, '15	Main Return	500	110	43,000	0.07	30	86

TABLE 2. MICHEL COLLIERY

No. 3 East Mine

6	July 5, '15	West-Side Split	120	...	14,400	2.90	417	5,004
8*	Aug. 4, '15	West-Side Split	...	...	18,500	1.33	246	2,952
9	Aug. 3, '15	West-Side Split	120	...	18,500	3.33	616	7,392
10	Aug. 3, '15	Main Return	500	140	102,600	1.48	1,518	4,371
16	Aug. 18, '15	No. 6 East Split	100	...	13,050	0.64	83	1,195
17	Aug. 18, '15	East-Side Split	120	...	5,500	1.57	86	1,032
18	Aug 18, '15	West-Side Split	130	...	12,000	2.32	278	3,079
20	Aug. 18, '15	No. 8 West Split	160	...	21,000	1.59	333	2,997
21	Aug. 18, '15	Main Return	500	140	96,000	1.15	1,104	3,179
26	Jan. 7, '16	West-Side Split	180	...	23,400	1.46	341	2,728
28	Jan. 7, '16	No. 8 West Split	130	...	24,750	0.83	205	2,270
44†	Feb. 17, '16	No. 6 East Split	120	...	19,800	1.24	245	2,940
45†	Feb 17, '16	East-Side Split	120	...	17,000	1.17	198	2,376
29	Jan. 7, '16	Main Return	550	150	120,000	1.27	1,524	3,990
34*	Jan. 12, '16	No. 6 East Split	...	...	18,000	1.08	194	2,328
35*	Jan. 12, '16	West-Side Split	...	...	19,305	1.19	229	1,832
36*	Jan. 12, '16	East-Side Split	...	...	16,000	0.96	153	1,836
37*	Jan 12, '16	No. 8 West Split	...	...	16,500	1.28	211	2,337
38*	Jan. 12, '16	Main Return	...	...	120,000	1.22	1,464	3,833

TABLE 3. MICHEL COLLIERY

Old No. 3 Mine

1	Mar. 3, '15	East-Side	90	...	36,900	2.66	981	15,695
3	Apr. 13, '15	Main Return	450	150	96,000	1.64	1,574	5,036
5	June 16, '15	West-Side	220	...	42,000	1.49	625	4,090
7	July 8, '15	No. 3 Slope	200	...	7,500	3.83	287	2,066
11	Aug. 6, '15	No. 3 Slope	40	...	9,600	2.79	267	9,612
13	Aug. 17, '15	West-Side	125	...	26,100	1.74	454	5,230
14	Aug. 17, '15	East-Side	60	...	30,800	2.09	643	15,432
15	Aug. 17, '15	Main Return	230	125	80,000	1.76	1,408	8,815
30	Jan. 7, '16	West-Side	65	...	4,000	0.07	2.8	62
31	Jan. 7, '16	No. 3 Slope	150	...	4,500	2.41	108	1,036
32	Jan. 7, '16	East-Side	160	...	31,680	2.30	726	6,534
43†	Feb. 16, '16	Main Return	375	150	80,000	1.76	1,408	5,407
39*	Jan. 12, '16	West-Side	...	...	3,640	2.04	73	1,617
40*	Jan. 12, '16	No. 3 Slope	...	...	5,200	2.09	108	1,036
41*	Jan. 12, '16	East-Side	...	...	25,200	2.18	549	2,108
42*	Jan. 12, '16	Main Return	...	...	60,000	1.83	1,098	4,216

* Samples taken when mine was not working.
† Sample taken to replace sample lost en route to laboratory from series of Jan. 7, 1916.

Tables Nos. 1, 2 and 3 show the results of analyzing a series of mine-air samples taken in the three mines now being operated in the Michel colliery. The samples were taken at points that were representative of different sections of the mine and, as nearly as possible, under like conditions in the summer and again in the winter season; also, when the mine was working and again when it was idle, which made a fair comparison possible.

No. 3 East Mine

This mine has four ventilating splits. The daily output of coal is approximately 550 tons. Coal is produced in two shifts of 8 hr. each, or 16 hr. of the 24-hr. day.

TABLE 4. ANALYSES OF MICHEL MINE-AIR SAMPLES

(Edgar Stansfield, Analyst)

Sample No.	Chemical Analysis: CO_2	O	CH_4	CO	H	N	Technical Analysis: Air	Firedamp	Blackdamp
No. 8 Mine									
22	0.08	20.77	0.13	....	....	79.02	99.24	0.13	0.63
23	0.07	20.80	0.10	....	....	79.03	99.38	0.10	0.52
24	0.07	20.78	0.07	....	....	79.08	99.28	0.07	0.65
No. 3 East Mine									
6	0.13	20.29	2.90	....	....	76.68	96.94	2.90	0.16
8	0.08	20.52	1.33	....	....	78.07	98.04	1.33	0.63
9	0.16	20.12	3.33	....	....	76.39	96.13	3.33	0.54
10	0.10	20.50	1.48	....	....	77.92	97.94	1.48	0.58
16	0.09	20.65	0.64	....	....	78.62	98.66	0.64	0.70
17	0.09	20.51	1.57	....	....	77.83	97.99	1.57	0.44
18	0.13	20.29	2.32	....	....	77.26	96.94	2.32	0.74
21	0.14	20.13	1.15	....	....	78.58	96.18	1.15	2.67
20	0.08	20.51	1.59	....	....	77.82	97.99	1.59	0.42
26	0.09	20.53	1.46	....	....	77.92	98.09	1.46	0.45
28	0.05	20.71	0.83	....	....	78.41	98.95	0.83	0.22
29	0.10	20.47	1.27	....	....	78.16	97.80	1.27	0.93
34	0.07	20.55	1.08	....	....	78.30	98.18	1.08	0.74
35	0.08	20.55	1.19	....	....	78.18	98.18	1.19	0.63
36	0.06	20.57	0.96	....	....	78.41	98.28	0.96	0.76
37	0.06	20.53	1.28	....	....	78.13	98.09	1.28	0.63
38	0.10	20.43	1.22	....	....	78.25	97.61	1.22	1.17
44	0.06	20.54	1.24	....	....	78.16	98.14	1.24	0.62
45	0.07	20.63	1.17	....	....	78.13	98.57	1.17	0.26
Old No. 3 Mine									
1	0.13	20.22	2.66	....	....	76.99	96.61	2.66	0.73
3	0.14	20.44	1.64	....	....	77.78	97.66	1.64	0.70
5	0.19	20.26	1.49	....	....	78.06	96.56	1.49	1.95
7	0.09	19.94	3.83	....	....	76.14	95.27	3.83	0.90
11	0.07	20.25	2.79	....	....	76.89	96.75	2.79	0.46
13	0.19	20.32	1.74	....	....	77.75	97.09	1.74	1.17
14	0.14	20.22	2.09	....	....	77.55	96.61	2.09	1.30
15	0.19	20.24	1.76	....	....	77.81	96.70	1.76	1.54
30	0.08	20.79	0.07	....	....	79.06	99.33	0.07	0.60
31	0.12	20.23	2.41	....	....	77.24	96.66	2.41	0.93
32	0.18	20.18	2.30	....	....	77.34	96.42	2.30	1.28
39	0.16	20.16	2.04	....	....	77.64	96.32	2.04	1.64
40	0.10	20.30	2.09	....	....	77.51	96.99	2.09	0.92
41	0.15	20.19	2.18	....	....	77.48	96.46	2.18	1.36
42	0.16	20.21	1.83	....	....	77.80	96.56	1.83	1.61
43	0.18	20.29	1.76	....	....	77.77	96.94	1.76	1.30

Note—The "technical analysis" has been calculated from the chemical analysis by taking air as having the following composition: Oxygen, 20.93 per cent.; nitrogen, 79.04 per cent.; carbon dioxide, 0.04 per cent. All the excess inflammable gases are then reported as "firedamp" and the excess extinctive gases as "blackdamp."

There are about 70 men in the mine on the two producing shifts. Samples Nos. 6, 8 and 9 are all from the west-side split and are interesting inasmuch as Nos. 6 and 9, showing 2.90 and 3.33 per cent. of methane, respectively, were taken when the mine was working; while No. 8, showing 1.33 per cent. of methane, was taken when the mine was idle. This would indicate that the flow of gas was greater while the coal was being broken down than when the mine was idle.

Sample No. 10 was taken on the main return, at a point 350 ft. from the fan, and shows 1.48 per cent. of methane, or a volume of 1,518 cu.ft. of gas generated per minute, or 2,185,920 cu.ft. per day, which is equivalent to 4,371 cu.ft. of methane given off per ton of coal mined. Samples 16, 17, 18, 20 and 21 were all taken on the same day, Aug. 18, 1915, from four separate splits and the main return, while the mine was working. Samples 26, 28, 44, 45 and 29 were taken in January and February when the mine was working.

To show the effect on the generation of gas by reason of the mine being idle, samples 34, 35, 36, 37 and 38 were taken at the same points in the mine, Jan. 12, 1916, when the mine was not working. The results show little difference between the working day and days of idleness.

It must, however, in justice be stated that not more than 15 hr. had elapsed between the cessation of work and the taking of the idle-day samples.

Old No. 3 Mine

This mine has three ventilating splits; the output in two working shifts of 8 hr. each averages 375 tons per day. Table No. 3 shows a series of samples from each split and from the main return, taken at different periods throughout the year 1915 and the early part of 1916. Samples 39, 40, 41 and 42 were taken on an idle day, and show slight difference in the emanation of gas on working or idle days.

Special attention is called to sample No. 30. The analysis of this sample shows a methane percentage much less than that of any other sample taken in this mine. The chemist makes no mention of having observed a leak in the container at the time of making the analysis. But the fact that George O'Brien, inspector of mines for the district, reported that a Wolf safety lamp showed a slight cap of gas in the atmosphere at the time the sample was taken; and, further, sample No. 39, taken five days later when the mine was idle, shows 2.04 per cent. of methane, would seem to indicate that a leakage had occurred in the container during transit. Sample No. 1, taken Mar. 3, and sample No. 14, taken Aug. 17 the same year, 1915, on the east split, show respectively 15,695 and 15,432 cu.ft. of methane per ton of coal mined.

The volume of gas given off in this mine, while always large, seems to be materially increased at points where the coal has been subjected to pressure and crushed; this is especially noticeable near the breaks shown in the cross-section of strata, in this portion of the field. Blowers of more or less intensity are often encountered here and, despite the fact that the ventilating current in many cases equals 1,000 cu.ft. per min. per man on the split, and that a limited number of men, rarely reaching and never exceeding 20, are breaking down coal on any given shift, it is often necessary to reduce the number of men in the split for several days or a week, in order to prevent the atmosphere in the split becoming charged to the danger point.

The average daily volume of methane, in cubic feet per ton of coal mined, in each mine, is as follows:

VOLUME OF METHANE PER TON OF COAL MINED

Mine	No. of Samples	Aggregate, Cu.Ft.	Average, Cu.Ft.
No. 8	3	265	87
No. 3 East	19	57,671	3,035
Old No. 3	16	87,992	5,500
General average	38	145,928	3,840

The average volume of methane per ton of coal mined shown from nine samples from the main returns of these mines equals 4,326 cu.ft.

Table No. 4 shows both the chemical and the technical analyses of the samples taken in the colliery.

The following analyses of coal taken from seams Nos. 3 and 8 are typical of the Michel colliery:

No. of Seam	Moisture	Volatile Combustible Matter	Fixed Carbon	Ash
3	1.01	20.95	71.00	7.04
8	1.50	22.10	68.50	7.90

The coals are very friable and the use of explosives in getting the coal is limited. The field is gaseous and safety lamps only are used, the Wolf lamp being the one in general use.

A reference to the section of the field at this colliery (Fig. 1) will show that the No. 8 seam, on the north side of the valley, is pitching with the slope of the mountain, the cover being comparatively light, approximately 300 ft. thick, which doubtless accounts for the small quantity of gas given off by this seam. Seams No. 3 and No. 3 East, on the south side of the valley, dip into the mountain and attain a cover of approximately 1,200 ft. in thickness.

What Did You Do?

Did you give him a lift? He's a brother of man,
And bearing about all the burden he can.
Did you give him a smile? He was downcast and blue.
And the smile would have helped him to battle it through.

Did you give him your hand? He was slipping down hill,
And the world, so he fancied, was using him ill.
Did you give him a word? Did you show him the road?
Or did you just let him go on with his load?

Do you know what it means to be losing the fight,
When a lift just in time might set everything right?
Do you know what it means—just the clasp of a hand—
When a man's borne about all a man ought to stand?

Did you ask what it was; Why the quivering lip;
Why the half-suppressed sob and the scalding tears drip?
Were you brother of his when the time came of need?
Did you offer to help him or didn't you heed?

"Safety Bear" Letter.

Subduing Fire at Grayson, Ill.

A fire at Grayson, Ill., started from a shot, and because of a series of explosions following it was impossible to subdue it, and the shafts were both sealed at the surface. The shaft bottom was so cut up that it was practically impossible to build an air lock at the bottom. With the outside as a base, and working with teams of five men led by Scott, Nichols and Towal, the recovery party descended a 300-ft. shaft, penetrated the interior of the mine 2,500 ft. to where the fire originated, erected stoppings across both entries and reëstablished the ventilation in three days.

An incident that happened after the underground work had been completed will indicate the kind of mixture in which the men had been working, and will illustrate also that carelessness must not be indulged in even at the very end. The air shaft had been sealed by the erection of a stopping in the fan drift. When it came time to start the fan a workman was directed to knock down this seal. He had hardly accomplished his purpose before he fell unconscious.

Others standing by and seeing his predicament, jumped to his assistance, and in less time than it takes to tell it six men were down in a heap. Mr. Scott, noting the situation, had enough presence of mind to have the fan started, thus blowing fresh air directly on them. Two of them were very ill for several days, but fortunately all recovered. It was in an atmosphere as dangerous as this that this difficult work was carried through by the men in breathing apparatus without a single mishap to any of their party.—*Oscar Cartlidge, Ottawa, Ill., at the Detroit Meeting of the National Safety Council.*

Working Over an Old Mine

By F. W. Campbell*

SYNOPSIS—Novel systems and methods devised for reworking an old abandoned mine. Roof conditions are poor and require close attention.

A method of mining still in its infancy is being successfully used by the Nay Aug Coal Co., of Dunmore, Penn. The company is working over territory that was mined and partially robbed by the old Roaring Brook Coal Co. years ago.

In the early days of coal mining in this region only the best parts of the veins were marketable. Any part of the vein that was "rusty," "slippy," or checked with mica

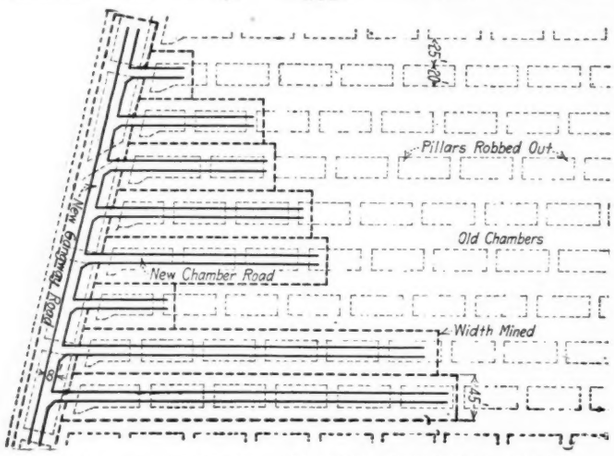


FIG. 1. METHOD OF WORKING THE COAL SEAM

partings, was thrown into the gobs, or left in place if it happened to be at the top or bottom, provided the minable part of the seam afforded a sufficient working height.

As the margin of profit was not so great as it is now, the operator could not afford to do a great deal of dead work or handle much rock; and when a small bench of coal happened to be isolated from the body of the vein by a considerable thickness of rock it was usually left untouched. The methods of robbing pillars were not so advanced as are those of the present day, and many pillars were lost.

The present company is mining in three veins, known as the First, Second and Third Dunmore veins. They are driving roads through the caved and robbed territory, reclaiming the pillars and also recovering top and bottom coal left in by the old company.

As a great deal of rock must be handled in driving roads through caved territory, the roads are made as narrow as it is possible to have them with safety, gangways and chambers being 8 ft. and 7 ft. in width respectively.

The mine car used is of 1¼ tons capacity, and including a 6-in. "topping" clears 3 ft. 10 in. over the rail. The outside width is 3½ ft. and the length, including the bumpers, is 8 ft. 4 in. The track gage is 22 in.

There are many advantages in using a small car in an operation of this kind, some of which are as follows: The light weight makes it possible for a man to shove an empty car up a considerable grade or for a mule to pull it out of a steep dip; the narrow width makes it possible to skip a narrow pillar without weakening it too much, saving the handling of tons of rock in the badly caved sections.

The following is the method employed in the Top or First Dunmore vein, where two benches of bottom coal are being mined and now and then a pillar or a stump of a pillar when encountered: The average pitch of the vein is about 2 deg. The new roads are driven as near as possible through the center of the space previously occupied by a line of pillars (see Fig. 1), and the bottom coal is taken up in each place to a width of 40 to 45 ft., or from center to center of the old chamber roads. The bottom coal is in two benches, the top one being from 3 to 4 in. thick and overlaid with 6 in. of slate, and the bottom one from 15 to 18 in. thick and overlaid with from 15 to 18 in. of "shell rock" and fireclay (see Fig. 2).

In mining the coal the shot holes are drilled in the bottom bench and given a sufficient charge of powder to shake up, but not lift the overlying strata. As only a small charge of powder is required to loosen the mass, the coal is broken up but very little, and about 60 per cent. of prepared sizes are obtained.

The gob is rehandled and cleaned of all bony and fine coal, and the rock is packed on either side of the road.

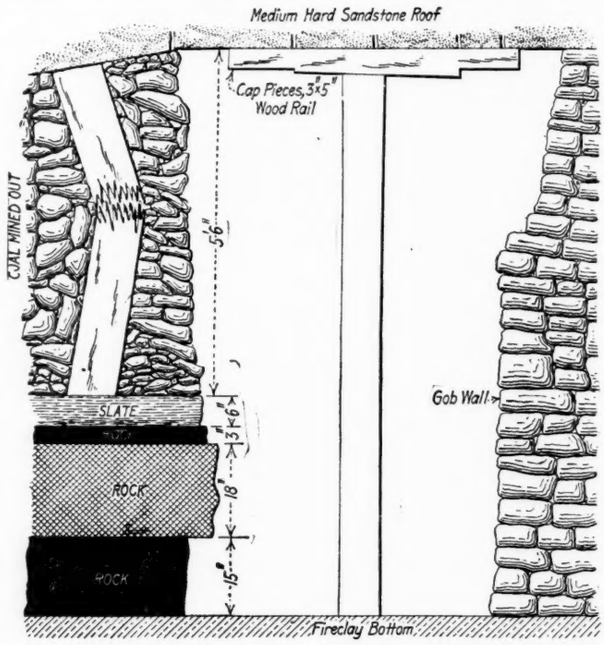


FIG. 2. SECTION AT WORKING FACE

The word "packed" in this case does not mean gobbed, but that rough walls are laid up and wedged at the roof, beginning at the rib and carried out to the line of props which are placed on both sides of the road at intervals of 6 ft.

At the inside corner formed by the intersection of the chamber with the gangway an 8- or 9-ft. timber cog is usually placed and walled up. This cog helps to support the roof and acts as a brace to the rock pack, preventing

*Mining engineer, Edward Spencer Estate, Pittston, Penn.

it from bulging out on the gangway, which it would likely do on a grade when the settling of the roof begins (see Fig. 3). As the strata over the vein were naturally badly fractured when the pillars were removed a gradual settling begins when any considerable area is disturbed. The duty of the rock pack is to sustain this load, which it usually does after a settling of from 1 to 2 ft. Whenever it is possible the roads are driven with at least 6 ft. of height over the rail, so that the clearance will not be much under 5 ft. after the settling.

The rock pack when brought out to the line of props is faced behind and not flush with the props (Fig. 3). The reason for so doing is that when the settling occurs many props are broken and forced out of position and have to be replaced. If the packs were brought out flush with the props, many gaps in the face of the wall would occur, thereby weakening it and allowing a further settling. It would also be difficult to reset the props in their original position.

The rock pack is usually kept within 5 to 8 ft. of the working face. As many bad slabs and badly fractured places are met with in the roof, long cap pieces, or pieces

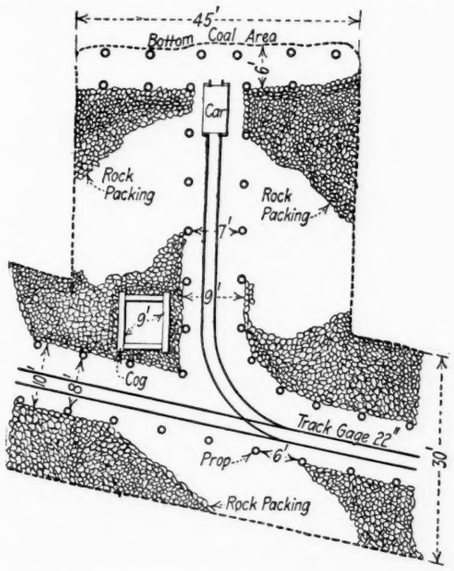


FIG. 3. DETAILS OF A WORKING PLACE

of wood mine rail 3x5 in. and from 3 to 6 ft. in length, depending on the conditions encountered, are used over the props. These cap pieces only afford a temporary protection and are used at the working face (see Fig. 2). In cases where the roof presents an uneven surface, small blocks of wood, such as prop ends, are wedged in the open spaces.

Badly caved and broken-up sections are sometimes encountered that are too dangerous and costly to be worked at a profit. In this case the working face is narrowed to a safe working width, until the difficult ground is passed. Some little coal is lost by this method, but on an average 75 per cent. of the bottom coal is recovered.

The excess of rock that must be handled in driving the gangways and in going through the badly broken-up sections in the chambers is loaded into cars and then reloaded in the old and abandoned roadways.

The miners are all company men, receiving $2.50 per day; laborers receive $2.08 per day. A miner and his laborer load an average of four tons of coal per day and keep their place in good condition.

The profit on mining by this method is from 20 to 25c. per ton, and as the men employed have to be educated to this new method, the working organization must be of the best to obtain good results. With such a narrow margin of profit, operators would hesitate to work such a proposition by itself, but when worked in conjunction with other veins on which a larger profit can be made, the company gets the advantage of a greatly increased tonnage.

The method employed in the Second Dunmore vein, where only pillars are being recovered, is the one commonly used in this section—namely, skipping a line of pillars for a certain distance and then robbing them back to the branch. Some heavy caves are being driven through to reach territory in which pillars were left.

In the Third Dunmore vein the working method is similar to that used in the First, but not so costly, since many pillars remain and both top and bottom coal is being reclaimed. The top coal is in two benches, one 7 in. and the other 8 in. thick. They are separated from each other by about 6 in. of rock. The bottom coal is about 10 in. thick and overlaid with 3 in. of rock.

Although this method of mining is dangerous, and the men are nearly always working under a poor roof, they are well aware of their danger and have remarkably few accidents.

The coal is prepared through a wet breaker, equipped with old Christ jigs. The average of prepared sizes of coal made is about 63 per cent., and the percentage of good coal going to the rock dump never exceeds 3 per cent. This record is a good one, and in my opinion one that many coal companies could profit by.

The system of mining bottom coal is original to the best of my knowledge, and was perfected by Supt. John A. Hines and his capable force of assistants.

Recent Legal Decisions

Contributory Negligence of Injured Repairman—An experienced mechanic engaged in repairing a hoisting plant in a coalyard was not entitled to recover for injuries sustained through carelessly assuming a position in doing his work, knowing it to be dangerous. (Pennsylvania Supreme Court, Owens vs. Robert Henderson & Co., 98 Atlantic Reporter, 613.)

Liability for Coemployee's Negligence—The operator of an Alabama mine is not liable for injury to a miner, due to falling of a rock in an unsafe place, if the duty of making the place safe had been entrusted to a coemployee of the injured man, in the absence of any showing that such coemployee was incompetent. (Alabama Supreme Court, Wadsworth Red Ash Coal Co. vs. Scott, 72 Southern Reporter, 542.)

Title to Underlying Mineral—A conveyance of underlying coal by the owner of land implies the grant of reasonable access through the surface for the purpose of removing the coal, and this right will not be deemed to have been lost through adverse possession through the mere fact that the owner of the surface and his successors have been in exclusive possession of the surface for many years. (Tennessee Supreme Court, Northcut vs. Church, 188 Southwestern Reporter, 220.)

Right to Lien for Price of Coal—Even if it be conceded that the statutes of North Carolina are broad enough to give a seller of coal for use as fuel in a textile fabric factory a lien upon the proceeds of the sale of cloth, on insolvency of the corporation operating the factory, such lien could not be enforced without identifying funds in the hands of a receiver of the company as such proceeds. (North Carolina Supreme Court, Norfleet vs. Tarboro Cotton Factory, 89 Southeastern Reporter, 785.)

The Labor Situation

General Labor Review

The miners at the Mahanoy City colliery went on strike Nov. 15 to compel one of the men to pay his union dues and equip himself with the regular union button issued for the present quarter. Button strikes, which in number have led the list in the anthracite region for many months, now appear to be on the decline.

The mine workers have induced all who can be induced to enter the union and are satisfied or feel that they have to be. They are becoming reconciled to the contract as far as it is being enforced, for some concessions have been made in reference to the 8-hr. rule. On the whole there are fewer disturbing conditions now than before, and there is not the incentive to demand increased wages to correspond to increased prices, because the large anthracite operators are not asking any more for their coal than is justified by past prices and the recent increase in wage.

The strike at the Primrose slope of the Jeansville colliery about the introduction into the workings of a wheelbarrow by one of the miners has come to an end as a result of the work of International Board Member Neil J. Ferry.

A strike equally hard to understand occurred on Nov. 24 at the Bear Valley colliery of the Philadelphia & Reading Coal and Iron Co. A mule was transferred from one part of the workings to another, and the miners where the mule had been in the habit of doing his turn struck to compel the company not to transfer the mule.

Reference is made in another article in this department to a strike against the customary and contractual "topping" of cars. The miners of the G. B. Markle Co.'s Highland mine returned to work Nov. 23, the company consenting to sell the same kind of powder as was used at an earlier date.

Renewed I. W. W. Agitation in Northern Field

Renewed activity by organizers of the Industrial Workers of the World in Pittston and its vicinity is believed to be the forerunner of another attempt to force a general suspension of operations around that town. After a lapse of two months, the branches of the organization at Dupont, Duryea, Old Forge and Exeter Borough have resumed their meetings, and organizers from far and near, including some of the leading officials, have addressed the mine workers. Inflammatory utterances have been reported to the police and coal-company officials. The area around Pittston has not yet recovered from the labor shortage resulting from the three weeks' strike of the I. W. W. in September, when at least a thousand men left for positions in other industrial centers, mostly for the munition-making towns.

The situation of the Clearfield district of central Pennsylvania is becoming more acute. Two thousand men around Osceola Mills are on strike for increased wages. The companies affected near Osceola are the Moshannon, with 6 or 8 collieries; the Penn, Ghem, White-Dugan, Duncan, Phœnix and Western. The men ask for $1 to $1.25 per ton. The mines affected are those owned by operators who are not members of the Central Pennsylvania Coal Operators' Association of District No. 2.

Strike Permissible If Union Mines Are Spared

So long as other mines are not involved nothing in this strike is deserving of disapproval. The miners who have no contract have a perfect right to strike. In fact it is only right that operators who do not sign contracts should be subjected to demands for increases in wages when costs of living go up, wages elsewhere increase and profits rise to large figures. They are always ready to cut wages whenever they can and are not entitled to the protection of a contract to which they have not subscribed.

It is a pleasant office to have to record that the officials of the United Mine Workers of America are trying to keep their men in strict obedience to the contract they have signed. They are doing thereby a noble work for unionism. Miners who make a contract assure themselves of a certain definite wage, but sometimes, when business is exceptionally brisk, they are chagrined to find that their wages do not rise as much as those in nonunion industries and nonunion areas. Thus Somerset County and the eastern part of West Virginia have given larger raises than the union districts, and the United States Steel Corporation has raised its men this year in all 33 per cent., 10 per cent. being added to the wage already paid up to Nov. 21.

The companies which have contracted with retailers and large purchasers are feeling just like the mine workers that these long-time contracts are not to their interests. They wish that they also were free to put their prices just where they will. But in the hard times with business depression these contracts and those written by the mine workers appear extremely desirable documents to those who have set their names to them.

Two hundred or more mine workers at the mines of the Altoona Coal and Coke Co., at Coupon, in Cambria County, near the Blair County line and the town of Gallitzin, are on strike. They, like the mine workers around Osceola Mills and Philipsburg, demand $1 and $1.25 per ton for mining coal and refuse to abide by the scale granted in April, which stipulates that 73c. per ton shall be paid for pick mining and 45c. per ton for loading machine-mined coal. The men declare they want a part of the high profits which the operators are realizing as a result of the prevailing high prices. An effort is being made to bring about a settlement between the men and the company officials. There is also a strike at Hyde City, in Clearfield County.

On Nov. 16 it was announced that the strike of the mine workers of the Loyalhanna Coal and Coke Co., at Wehrum, Indiana County, had come to an end with a settlement. Practically all the miners who recently quit their work have returned to the mines.

Is Somerset County Approaching Peace Basis?

The labor situation in Somerset County has improved considerably during the past week. At Hooversville, the Knickerbocker Smokeless Coal Co. and the Baker-Whiteley Coal Co. are steadily increasing their output and the number of men at work. The Atlantic Coal Co.'s Atlantic No. 1 mine went on a strike in the early part of last week because the company a couple of weeks ago advanced the price for mining only 5c. per ton, whereas a general increase of 7c. per ton was made throughout the county. The company granted the other two cents to the men and they resumed work Friday, Nov. 24, under nonunion conditions. This mine is located at Boswell.

The Atlantic Coal Co.'s Atlantic No. 2 mine at Myersdale, the Atlantic Big Vein Coal Co.'s Keystone mine at Myersdale and the Boynton Coal Co.'s mine at Elk Lick, which have been on strike for some time, have resumed operations under union conditions, and the men of the Harding Coal Co. at Elk Lick returned to work with some of the union requirements granted. The Myersdale Fuel Co. and C. J. Rowe & Bros., at Myersdale, have resumed operations on a nonunion basis, the former with 25 men and the latter with 12.

The Stauffer-Quemahoning Coal Co. at Listie is increasing its output though operating on a nonunion basis. So also is J. Blair Kennerly at his Pretoria mine near Holsopple. The two mines of the Consolidation Coal Co. that had been operating on a much-reduced basis on account of union demands are back to normal output. No contract has been made with the union. The Grassy Run Coal Co.'s three mines, C. K. Bauman & Co. and Samuel Baker & Son are still on strike for union conditions, also the Merchants Coal Co.'s Elk Lick mine. The car supply in the Somerset district as well as in other parts of the western and central Pennsylvania fields has been extremely bad the past week.

Trouble in Broad Top Field of Pennsylvania

With 800 miners in the Broad Top bituminous coal region on strike, with the Saxton and Mount Dallas furnaces shut down for lack of coal, with the East Broad Top R.R. scraping up screenings for the use of its engines, and with the injunction served on the coal miners of the Rockhill Coal and Iron Co. seeking to compel them to live up to their agreement of last summer to mine coal at a rate of 75c. per ton, the situation in the Broad Top coal region in Huntingdon County is becoming more acute hourly.

The workers gave formal notice to all operators in the Broad Top region that unless a 33⅓ per cent. increase was granted by Nov. 26 the whole force of miners will walk out on the next day.

Judge Bailey expects to hear arguments on the injunction granted the Rockhill Coal and Iron Co., of Robertsdale, on

Nov. 29, and the United Mine Workers of America, through James Purcell, president; Charles O'Neil, vice-president, and Richard Gilbert, secretary of the district, is determined to fight with legal talent the making of the injunction permanent. Ex-Judge A. O. Smith was retained for that purpose.

The Rockhill Coal and Iron Co. is awaiting the action of the court in the injunction proceeding. If the court decides in its favor the company expects to bring a suit for the injury to its business and for the loss of profits incurred thereby against the United Mine Workers of America. Fifteen hundred men are on strike. The company wants the men to go back to work or surrender their tenancy of the company houses.

Union Activity in Ohio and West Virginia

A strike recently occurred at mine No. 11 of the Superior Colliery Co., at Jackson, Ohio, because a train on the Detroit, Toledo & Ironton R.R., which took the men to their work, was 20 min. late. The men refused to go to their work on the day following the delay.

It is not necessary here to refer to the settlement of the Sunday Creek Coal Co. with its men at the San Toy mines and the creation of a new mining district, geographically and in wage scale, occupying a position between the Crooksville and the Hocking Valley regions. The subject is treated at length in a separate article in this department.

According to reports emanating from the mine workers' headquarters at Bridgeport, Ohio, West Virginia mine workers will probably enter the union within the next year and will affiliate with the eastern Ohio subdistrict. They will ask to be paid the same mining scale as that ruling in "eastern Ohio." From all appearances this will not increase the cost of production in the Panhandle, for the wages of the eastern Ohio operators have always been kept up with the union rate in order to prevent the nonunion men from migrating across the Ohio River to the union mines.

The mine workers of Illinois, many of them foreigners who have been graciously granted the right to domicile in this country, have petitioned President Wilson, suggesting the placing of an embargo on foodstuffs now being shipped to foreign countries, urging that by such an embargo the present high prices would be reduced. It might be more efficacious to ship back to the lands from which they come some of these protesting persons who care little whether their relatives and former friends starve or not.

Genuine Americans are the last to suggest any such illiberality. Rather they have been ready to give freely of their bounty to the destitute in Europe. The resolution states that 82,000 miners support its terms. It seems doubtful that 82,000 persons in America, much less foreigners, could be found with sentiments so ignoble.

Frank Farrington Is Acquitted by Union

Frank Farrington, of Streator, president of the Illinois district, was acquitted by the same convention at Peoria that passed this questionable resolution. He admitted that he had received $1,000 from Col. Frank L. Smith at Dwight, Ill., and declared that he had distributed the money to admirers of the candidate through another party in Springfield. It appeared that he had not gained one cent. from his political activity. Friends of Frank Farrington will be much pleased over his vindication, though they had at all times fully anticipated it.

The vote did not give Farrington a very generous acquittal. There were 469 votes cast in his favor and 265 for his conviction. Three charges were brought against him—using the official stationary of the union for political purposes, accepting money for political efforts and neglecting his duty in connection with conditions among southern Illinois miners.

The convention cost the miners about $50,000. Farrington declared the charges were made to prevent his reëlection on Dec. 12. He is opposed in his candidacy by Frank Hefferly, of Collinsville, and James W. Murray, of Westville. Duncan McDonald, the secretary-treasurer, is opposed by Walter Nesbit, of Belleville. There are eight candidates for vice-president and 37 for auditor.

The Bolen Darnell Mine No. 2, at Hartford, Ark., recently laid off some men, claiming that there were no places in the mine in which these miners could work. The rest of the men demanded compensation for the men so made idle and went on strike to secure it.

The Arkansas coal-mine workers are taking a referendum vote on the ratification of the biennial contract covering wages and working conditions as drafted in the recent Kansas conferences between the representatives of the mine workers and the Southwestern Interstate Coal Operators' Association. When the referendum vote is completed if the decision is, as expected, in favor of the contract, a conference will be held at Kansas City at which the final signatures of the officials of the mine workers and those of the operators' association will be affixed to the contract.

In Boulder County, Colorado, the wages of coal-mine workers have been raised. Outside men who got $2.80 per day now receive $2.94. Miners who were paid 63c. per ton now are paid 66c., the full increase granted in all the central competitive region, outside the Pittsburgh district, the miners in which, it will be remembered, got more than a 3c. increase for machine-mined coal. About 2,000 men are affected by this increase in wage. The operators claim the rate is the highest paid in the United States. This, of course, is not true. Still the wage is quite fair. Weld County mine owners may now follow the lead of those in Boulder County.

The United Mine Workers of America recently made demands on the operators of southern Alberta and northeastern British Columbia for a further war bonus of 25 per cent. on account of the increased cost of living. As an alternative they offer to accept the award of a Board of Inquiry composed of three representatives on each side and three appointed by the Canadian Government. This board is to investigate the cost of the necessaries of life and to fix the wages in accordance with its findings.

The Western Coal Operators' Association, representing the employers, held a conference at the head office in Calgary and on Nov. 16 decided that the demands of the miners could not be granted. The ultimatum embodying the demands of the men expired Nov. 25, and a general strike was regarded as certain. An appeal has been made by the operators to T. W. Crothers, the Canadian Minister of Labor, requesting him to impress upon the men the duty of living up to their agreement. This contract, which fixes the current rate of wages, has still four months to run.

Strike Against Topping Cars

A strike involving about 1,200 employees of the Park Place colliery of the Lehigh Valley Coal Co., and which caused a loss of about $40,000 in wages and of almost 20,000 tons in production, was called off by the local union on Friday, Nov. 24, the men to report for work on Monday, Nov. 27.

The miners in one section of the operation decided that they would cease to "top" their loaded cars above the car sides. They proposed henceforth to load them "water level." Despite the universal practice in the anthracite mines and the awards of the Anthracite Strike Commission, which provide for topping and which have been considered in the fixing of the various rate sheets, the men remained obdurate to all pleadings of their officials and refused to resume work. After closing one slope for a period of five working days, the malcontents succeeded in affecting the whole operation, which was tied up for an additional 10 working days.

As the company officials were unable to obtain any relief otherwise, they decided to present a grievance against the employees at a meeting of the Board of Conciliation on Thursday, Nov. 23, and asked that the grievance committee of the local union be summoned to appear. This action evidently had the desired effect in causing the local to decide upon a resumption of work.

At Last the Sunday Creek Coal Co. Starts To Work

The miners' officials and J. M. Roan, the commissioner of the Ohio Operators' Compensation and Labor Bureau, representing the Sunday Creek Coal Co., have been negotiating for several weeks regarding the wage scale to cover the two mines at San Toy, Ohio. The matter has been adjusted and work has been started. In making the settlement a new mining scale district was established. During the negotiations the miners contended for the Crooksville scale, while the operator wanted to follow the provisions in force in the Hocking Valley. A compromise was effected which incorporates certain provisions of both scales. During the idleness of 18 months, the Sunday Creek Coal Co. put the mines into excellent shape, and they are now among the best equipped in the state. At the start 100 miners went to work, and it is hoped to increase that number to 500, which is the working force for which the mines are laid out. The long idleness caused many of the miners to move to other fields.

In brief, the scale is as follows: 11.75c. per ton for cutting with chain machines in wide work and 14.75c. per ton for the same in narrow work. The payment for drilling, shooting and loading in wide rooms is 42.5c., while the rate in narrow work is 51c. A scale was also made for top-cutting machines as follows: Cutting, 8.4c. per ton, and drilling, shooting and loading, 43.6c., making a total of 52c.

Power Department

Cadogan Power Plant

By Fred Norman*

SYNOPSIS—A small compact power plant generates alternating current, which is transmitted to a point near where it is to be applied and is there converted into direct current. The fuel is largely picking-table refuse, and the ashes are raked into steel cars placed in a tunnel under the boiler-room floor. The mine locomotives remove these ash cars from the tunnel.

Among recently constructed power plants for bituminous coal mines, the Cadogan installation of the Allegheny River Mining Co., supplying electric current to the Cadogan mine in Armstrong County, Penn., has incorporated in its make-up some features that may be of interest. A brief description of this plant follows.

The requirements of the mine for cutting, haulage, pumping, etc., is direct current at 250 volts, but as the mine is laid out on a large scale, transmission was an important factor, and it was decided to generate alternating current at 2,300 volts for transmission, converting this to 250-volt direct current by motor-generator sets, for the operation of underground machinery.

The power plant, as constructed, consists of two units of 375 kv.-a. each, with provisions made for extensions.

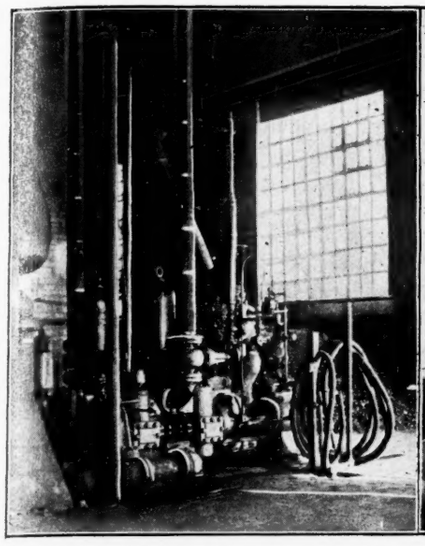
*Chief Engineer, Allegheny River Mining Co., Kittanning, Penn.

The power house, which is a brick structure, is built on the "twin" style, having two gable roofs meeting and joining in the center of the building. This makes two distinct compartments, one for steam generation and the other for the production of electric energy.

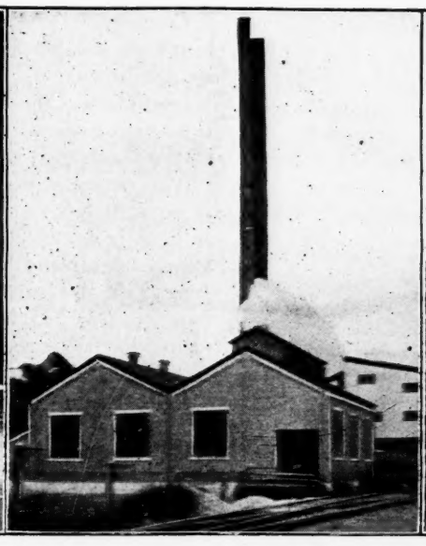
The building is constructed of yellowish-red brick laid in red mortar. The walls are paneled, and the building is covered with a red asbestos shingle roof. Concrete foundations were provided as well as large steel-sash windows, with concrete lintels and steel louver ventilators over the boiler compartment. Doors, sash and woodwork are painted black, giving the building a plain, but rather attractive appearance. The red asbestos shingle roof is laid on yellow pine sheathing, supported on steel purlins carried on steel trusses and spanning each compartment.

The boiler compartment has a reinforced-concrete floor in front of the boilers over the ashpit and air duct, while in the space for future installations on the side of the boilers, a temporary brick floor is laid. The generator compartment has a "Mastic" (an asphalt preparation) floor throughout. Walls and ceiling are painted light gray, with black wainscoting extending 6 ft. above the floor. This compartment is lighted by three 500-watt nitrogen lamps in spherical globes, suspended from the roof, and bracket lamps arranged along the walls. Floor attachments are provided for portable lights, used while working around the machinery. A 10-ton hand-operated crane spans the generator compartment and travels its entire length.

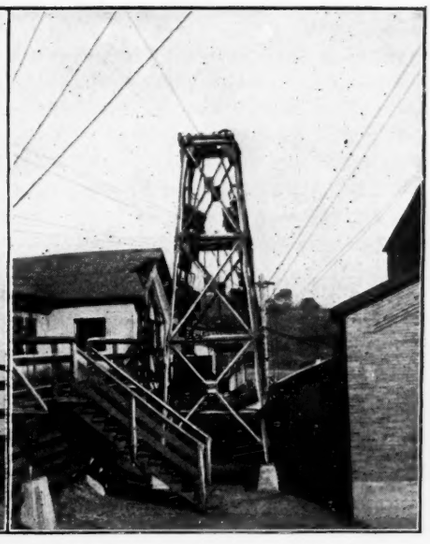
INTERIOR OF GENERATING PLANT, WITH ONE UNIT IN OPERATION



THE BOILER-FEED PUMPS



GENERAL VIEW OF POWER HOUSE



THE DISTRIBUTION TOWER

An addition to the power house, for the accommodation of the switchboard, allows the face of the board to be flush with the wall, with all wiring and apparatus on the back of the board concealed, and provides ample room for oil switches, etc., with easy access.

The power house is 80x65 ft., with an 8x23-ft. addition for the switchboard: It is 21 ft. high to the square and is divided into two compartments, each 40x65 ft., by a brick wall.

The boiler compartment contains two Heine safety water-tube boilers, each rated at 470 hp. These carry 150 lb. working pressure. They are set in one battery, with their rear ends toward the engine room. Each boiler has 267 3½-in. tubes and two 42 in. by 22-ft. steam drums. The heating surface of each is 4,705 sq.ft., while each has 84 sq.ft. of grate surface. A soot-blowing system is installed. One steel stack 56 in. in diameter and 140 ft. high is provided for each boiler. This is erected in the rear of the boiler brickwork. The stacks are guyed to concrete piers and steel bridgings are placed between them.

The boiler furnaces are fed by six Jones underfeed stokers, three to each boiler. These are operated by Coles automatic regulating valves. Forced draft is supplied by one blower fan, driven by two horizontal 8x8-in. Troy steam engines, direct-connected thereto. One engine only operates at a time, the other being held in reserve. The fan is placed outside of the building, blowing straight into a metal air pipe erected in a concrete air duct under the boiler-house floor.

The fuel employed consists of from 50 to 75 per cent. refuse from the tipple picking tables, crushed to suitable size, and from 25 to 50 per cent. slack coal. This is carried to the boiler compartment by an electrically driven flight conveyor, discharging through spouts to the floor for hand firing at present. Provisions are made for overhead bins with spouts into the stoker hoppers, for future installation.

Two 18-in. square holes for each stoker are cut in the concrete floor opposite the stoker retorts and 2½ ft. from the boiler fronts, for disposal of ashes. The space between the boilers and the holes is built up of 40-lb. steel rails laid skin to skin with tops up and the spaces between filled with concrete. This forms a platform upon which the hot cinders may cool after being removed from the retorts before being scraped into the trap holes. These holes are covered with ⅜-in. steel plates when not in use. The ashes passing through these trap holes fall into steel cars of the same size, pattern and gage as the mine cars in use at the mine, placed on a track in the tunnel under the floor. These cars are removed, when required, by electric locomotives. The ash track connects with the mine yard, and the haulage locomotives take care of the ashes, as they have the time to spare. The ashes are used for surfacing track, making wagon roads, sidewalks, etc., or can be wasted on the dump, if desired.

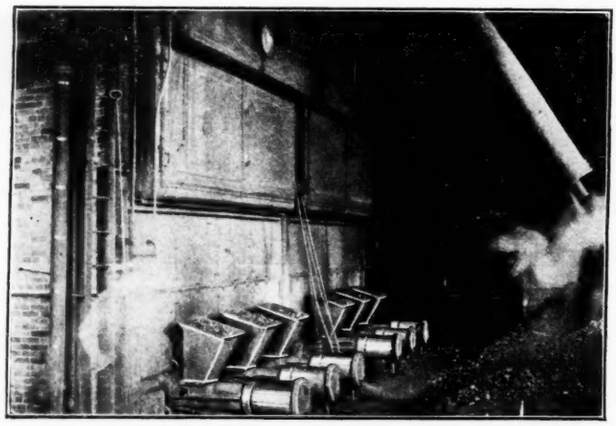
The boilers are fed by two American 12x7x12-in. outside center packed plunger steam pumps, equipped with 1½-in. Copes governors and Copes 3-in. continuous boiler-feed regulators. These pumps draw water from one 1,500-hp. Cochran open feed-water heater and purifier that receives its supply by gravity from a 50,000-gal. tank mounted on a steel tower 20 ft. high placed outside of the building.

The water-supply is obtained from the Allegheny River, on the bank of which a concrete shaft 10 ft. square and 36 ft. deep is sunk, with its bottom below low-water stage of the river. Two 6x8-in. American, electrically driven piston pumps are placed on the bottom of this shaft and connected to a 12-in. cast-iron suction line extending some 30 ft. out into the river, terminating inside a wooden crib filter box 4 ft. high 6 ft. wide and 12 ft. long, sunk into the river bottom and covered with broken stone and gravel. The pumps deliver water through a 4-in. line to the 50,000-gal. tank mentioned. In the future when condensing apparatus will be required, these pumps will be replaced with centrifugal machines of adequate capacity, and the discharge line replaced with a 12-in. cast-iron pipe.

In the rear of the boilers is a 4-ft. passageway for the removal of soot, etc. The blow-offs are connected to an 8-in. pipe under the floor, extending the length of the building to the outside, and then at right angles across the railroad tracks to a safe distance from the building. A bundy tilting trap cares for all drips and condensation.

Placing boilers with their rears toward the engine compartment, and the engines on the other side of a

partition wall with cylinders toward the boiler compartment, gives a minimum of steam piping. Each boiler is connected by 8-in. "goosenecks" to a 12-in. header in the rear of the boilers. This header is equipped with a drip-pocket at each end, and 8-in. connections are made from the top of the header, goosenecked through the wall to the engines. All steam piping, header, etc., are covered with asbestos sponge felt covering. High-pressure steel pipe with forged-steel flanges, screwed and



FIRING ALLEY IN FRONT OF BOILERS

peened in place, and copper gaskets, are used throughout for live steam.

The generator compartment contains two 375-kv.-a. alternator units, with space left for future installation of a 500-kv.-a. mixed-pressure steam turbine, to utilize the exhaust steam from the engines that at present is wasted to the atmosphere.

The two units consist of horizontal, side-crank, inclosed, self-oiling, nonreleasing gear, Corliss-valve, Ball steam engines, with single 20x30-in. cylinders, operating at 150 r.p.m., with 150 lb. pressure at the throttle. These machines are rated at 535 i.hp. each. The engines have a guarantee of 21.6 lb. of steam per horsepower-hour at full load, 21.3 lb. at three-quarter load, and 21.8 lb. at one-half load.

Steam connections from the header are flanged onto Cochran steam separators placed directly above the throttles. Ten-inch exhaust pipes are connected through a 14-in. line to the heater. A 14-in. blind flange connection is provided for a future extention to a condenser, when the mixed turbine mentioned will be installed.

Direct-connected to the engines are General Electric alternators of 375 kv.-a. capacity, each having 48 poles. These operate at 150 r.p.m. and generate 2,300-volt three-phase 60-cycle current. The generators have the following guarantee: Full load, 80 per cent. power factor; efficiency, 89.6 per cent.; three-quarter load, 88.5 per cent.; one-half load, 84.0 per cent.; 25 per cent. overload for two hours, and 50 per cent. overload momentarily. Placed in line with the steam cylinders of the engines, and belted to the generator shafts, are compound wound General Electric exciters. These are interpole, 125-volt, 20-kw., 950 r.p.m., direct-current machines, furnishing excitation current for the alternators, each unit being separately excited, but paralleled on the busbars. The exciters have the following ratings: One and one-fourth load, 83 per cent. efficiency; full load, 84 per cent.; three-quarter load, 83 per cent., and one-half load 82 per cent.

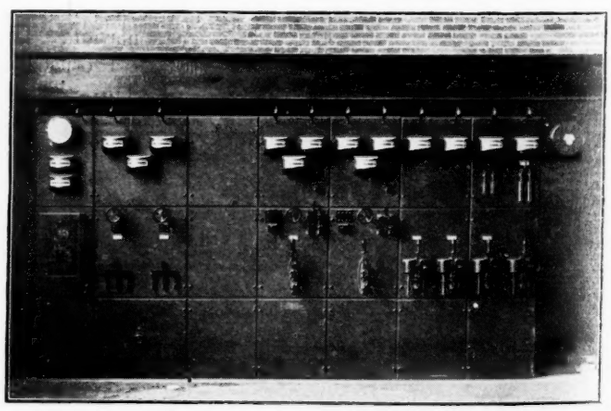
Connections between the alternators and the switchboard are laid in metal conduits under the floor, and consist of three-conductor copper cables, cambric covered and insulated for 6,000 volts. Field wire and exciter connections are of the same kind and material with the exception of the insulation, which is for 600 volts.

The switchboard, of 7 panels, each panel of 3 sections, is constructed of black marine slate slabs, arranged as follows from left to right facing the board: Regulator panel, containing synchroscope, high tension voltmeter, frequency meter and Tirrill voltage regulator; exciter panel controlling both exciters, with volt and ammeters, switches, rheostat handles, etc.; one blank generator panel to control future installations; two generator panels with watt and ammeters, oil switches, etc.; two feeder panels controlling four separate circuits, two on each panel. The circuits control substations, ventilating fans, transformers, and one held in reserve for future requirements.

The back of the board is so arranged that all high-tension apparatus is erected about 3 ft. from the board. Oil switches are provided with remote control, the levers of which are under the floor. A 7½-hp. three-phase 2,200/220-volt transformer, set in one corner of the switchboard compartment, and controlled directly from the board, cares for the lighting of the power house, the company office and the storeroom. Passageways at each end of the board give free access to its back. Supported on a bracket over the right-hand passage is a ground detector.

The outgoing leads are three-conductor cambric-covered cables in metal conduits, leaving the power house wall about 6 ft. above the floor. These are carried over to the distribution tower, where the cambric covers are removed and the three conductors separated for connection to choke coils.

The distribution tower is a steel structure placed 10 ft. from the power house wall and between it and the tipple. It is 25 ft. high, set on concrete piers, and provided with four plank floors. The tower contains three



FRONT VIEW OF SWITCHBOARD

single-phase 60-cycle, 2,300/220-volt, 75-hp. Pittsburgh transformers, where the current is stepped down to 220 volts for all tipple machinery and lights in the mine buildings. These transformers are placed on the lowest floor. Twelve choke coils, or reactors, three to each circuit, in conjunction with lightning arresters, care for the safety of the apparatus from lightning. The choke coils and arresters are placed up and down in the tower, and the terminals are connected to bare copper wire con-

ductors which extend from the top of the tower and are carried on high poles to the different destinations.

Two substations, each of 200-kw. capacity for the present, furnish 250-volt direct current for the operation of the mines. Additional substations will be erected as the power consumption increases. The substation buildings are 16 ft. square brick structures with pyramidal roofs, two windows and one double door. They contain 200-kw. synchronous motor-generators with three-panel switchboards. No. 1 substation is placed 2,000 ft. from the power house, while No. 2 is about 1½ mi. distant. The two are run in parallel through the trolley system.

The fan circuit, carried separate from the substation circuit, supplies power direct to 2,300-volt induction motors driving the fans, which at present consist of one two-speed, three-phase, 60-cycle induction Crocker-Wheeler motor of 150 hp., driving No. 1 fan, and one 40-hp. motor of similar type and make, but of constant speed, driving No. 2 fan.

Boiler Economy at Mining Plants

By D. J. Jenkins*

During the past decade considerable attention has been centered at mining operations on methods dealing with increased tonnage; but in obtaining this result attention and stress have been directed toward the improvement of steam-consuming machinery, such as haulage and mining machines. The steam-generating unit or boiler is of serious consequence when not in operation and of vital importance while generating steam. But in the majority of mine plants the economical operation of the boiler has been seriously neglected. Additional factors and the installation of equipment that would increase the efficiency of the boilers from a thermal standpoint have been frequently ignored. This neglect may be attributed to that inherent idea, "Fuel is obtained at the mines at cost."

The two great obstacles that interfere with boiler efficiency are impure feed water and soot formation. The former upon heating and boiling deposits a crust-like formation on the boiler heating surfaces. This accumulation retards the passage of heat, consequently reducing the steaming capacity and causes bagging and blistering. Soot is the result of incomplete combustion and forms a deposit that lowers the efficiency of the heating surface.

Practically all feed water in and around mine plants contains in different proportions the carbonates of lime and magnesia, generally accompanied by calcium and magnesium sulphates. The carbonates of lime and magnesia are held in solution by an excess of carbon dioxide and are completely precipitated in the form of a whitish mud upon boiling. Calcium sulphate is much more soluble in cold than in hot water and is entirely thrown down from a water at a temperature corresponding to 35 lb. gage pressure or 280 deg. F. Deposits of this character have a bad effect on boiler surfaces, the composition being hard and adhesive, thereby requiring frequent turbining to remove the scale. The deleterious effect of the calcium-sulphate deposit can be minimized to a certain extent by introducing soda ash with the feed water, causing a precipitate of calcium carbonate while the sodium sulphate remains in solution.

*Fairfield, Ala.

An idea of the enormous amount of sediment that may be deposited in a boiler can be gathered from the following example: In a 100-hp. boiler evaporating 3,000 lb. of water containing 100 gr. of scale-forming material per gallon per hour, provided no water is blown off, in one week's time, working the boiler on a 24-hr. basis, the amount of sediment would be approximately 300 lb.

Soot, as has been stated, is the result of imperfect combustion and is the main obstacle preventing the transmission of heat. It is composed of minute particles of carbon and mineral matter. Scientists have devoted considerable effort toward eliminating its formation, but as yet have been unsuccessful. Owing to its high nonconductivity, soot becomes a source of great loss in the economical operation of any boiler plant. Astonishing facts have been determined concerning the nonconducting powers of this material by actual tests and investigations performed by reputable engineers.

It has been proved that a clean boiler surface will transmit 50 per cent. more heat than when the same surface is covered with a ½-in. deposit of soot.

More important investigations have been carried out, especially in boilers in actual operation, but the majority of these tests have been made by or for mechanical soot-blower concerns, proving that it was economical to blow soot by mechanical rather than by hand blowers. The results of 25 tests performed in different types of boilers prove conclusively that mechanical blowers are more efficient and more advantageous to operate than the hand device. The range of the possibilities for economies which can be accomplished by installing mechanical soot blowers is so wide that it is impossible to make a definite statement as to the actual amount of fuel that can be conserved, except that the lowest test showed a saving that was unquestionably worth consideration.

At the mine power house, the return-tubular boiler is usually employed. This familiar type is difficult to clean by the hand-blowing method, especially when high-volatile coal is used. The soot formation possesses a great affinity for water, and when steam comes in contact with soot particles, it forms an adhesive, plastic mass, the removal of which is almost impossible.

Quite frequently I have observed large deposits of soot at the extreme end of the tubes after they had been cleaned by the hand method. This may be attributed to carelessness on the part of the fireman. On the other hand, the deposit may be due to the ineffectiveness of the hand blower. The presence of this deposit nevertheless reduces the draft, thereby preventing combustion from taking place, as well as reducing the amount of steam made. Furthermore, should the draft become diminished, it is essential that the thickness of the fire be reduced in order to maintain an equal rate of combustion.

There are several obvious reasons why a mechanical blower should be installed. By its use a higher rate of evaporation is guaranteed, an excess of air is not required to secure complete combustion, the temperature of the stack gases can be maintained constant, and cleanliness is insured. The fireman is in a better condition to render service. He no longer contends with a polluted atmosphere of dust and soot, and as a result the work is congenial, which is a highly desirable factor tending toward the maintenance of an efficient and economical steam plant.

Editorials

Do Your Christmas Shopping Early

The catchline, "Do Your Christmas Shopping Early," has taken hold on the public. The newspapers have exploited it by cartoons and otherwise. The retail stores have circulated it, and the philanthropic have joined in its acclaim. So that now everyone believes it a positive duty to do one's Christmas shopping early and thus save the strain that is inevitably put on shop girls, delivery men and horses in the festive season. Probably the storekeepers started the agitation primarily to increase the volume of buying and to handle business with less cost. But it was a good movement and might furnish a suggestion to coal operators.

Why not start a campaign to convince the buyer, industrial and domestic, large and small, that he will get a better price and a surer service by buying his bituminous coal in the summer months, when business is at a low ebb? He invariably leaves his purchases till the last moment. As a result the demand increases business beyond the facilities of the railroads, sometimes beyond those of the coal operators. The call for coal comes when the streets are cluttered with snow or when the footing for horses is precarious in the extreme. The purchaser wrathfully orders fuel from several sources, and these multiplicate requisitions cause increases in price altogether out of relation to the genuine demand.

All should combine to enunciate the commandment, "Do your winter coal shopping early"—the miner who is idle in the summer, the operator whose mine is run at a loss, the railroad man who has his equipment idle and rusting on the tracks in the hot weather, the truckman who has to serve his longest hours when the days are both shortest and coldest, the animals that must strain most when the streets are slipperiest and heaviest with snow, and the public that pays and must always pay most during these periods of stress, and that is also interested in removing the delays to traffic resulting from stalled coal wagons. In fact it would be a wonderful help to business if coal men, instead of delivering coal on snowy days, could use their equipment for hauling away the snow that cumbers the streets.

Perhaps there might be a further means of promoting better conditions. How would it be if the next time the miner asks for an increase—and it looks much as if he will be well entitled to it when the next contract comes—to suggest to him a differential between winter and summer? Further, if he demands and the operator sees fit to grant him any reduction in hours, then let the reduction apply only to the summer months, when the demand is light.

By paying the miner higher wages in the winter the price of coal would automatically favor summer purchasing. It would pay an interest and storage rate to those who provided for this service to the industry, the railroads and the public. We have no right to condemn the service the railroads are giving us so long as we do nothing to help distribute the burden over the year. However, the railroads themselves should help to smooth the seasonal irregularities. Why, when freight rates are raised, which is sure to happen soon, could they not arrange to put all that increase on the winter service? The railroads surely would gain immensely by regularity of operation, which would enable them to keep their equipment in continued profitable operation and their employees steadily at work. It would also increase their traffic at the one period of the year when it is conducted at least cost and with least loss.

And what will the operator do? Coöperation has been asked from both miner and railroad. It would seem right to ask something from the operator, but it will be conceded on reflection that there is nothing new to be demanded of him, for he is already the only factor that is making concessions to correct the seasonal demands of the industry. The operator is giving now more to that end than the miners and railroad men are asked to give together, and he will continue to contribute liberally toward regularity of production as he has in the past. His prices will be seasonal. He will be satisfied if thereby he can arrange that his activity will not be seasonal also.

If the miner will provide 10c., the railroad 10c. and the operator 20c., a difference of 40c. will be created—and none of them should be requested in seeking this end to reduce their summer rates of operation one iota. The differentials should be additive wholly.

The Shortage of Lake Coal in the Northwest

A storm of hurricane proportions swept over the Lakes Thursday and Friday of last week, and as a consequence the Lake trade suffered a new check. Ships rode out the gale at anchor in the rivers and in sheltered places, and no loss of life or vessels is reported, with the exception of barge No. 82 of the Standard Oil Co., which was driven on the rocks in Lake Ontario while on her way to the coast. Because of the delays resulting from the storm a number of freighters will lose one trip, to some extent tending to reduce the tonnage of coal that might have been carried. The coal movement is not heavy, because of the inability to get cargoes to loading docks.

The car supply has again fallen off, and the railroads have no hopes of any improvement. As a rule Lake shipments are suspended at this time of the year, which helps the car supply; but owing to the fact that marine insurance has been extended till Dec. 8, heavy shipments are still being made to Lake ports for late clearances and also storage cargoes that will go up the first thing in the spring of 1917. These cargoes are bringing prices as high as $8 per ton f.o.b. vessels at Lake Erie ports.

The Northwestern markets are going to be short of coal this winter. Figures are now showing just what

there will be on dock Dec. 15, and today there is not a dock on the Great Lakes that has enough coal to supply the trade normally obtaining during the winter months.

It is thought by many that the closing of Lake trade will in some measure relieve the tense situation on smokeless and Eastern coals in the Middle West. Buying of Illinois and Indiana production in the Northwest during the last week has been brisk, owing to a shortage of Lake deliveries. Retailers are offering high prices to the docks for both anthracite and bituminous shipments, the country dealers outbidding one another.

The stiff advance in the price of anthracite, with the prospects of another increase soon, together with a shortage of tonnage on the docks, has made the coal dealers of the Northwest nervous. Deliveries from the docks have been curtailed and orders for future shipment refused, causing the Northwestern retailer to think that he will be confronted by a coal famine this winter.

Human Factor in Industry

A conference has recently been held at the Ohio State University entitled a "Congress of Human Engineering," its purpose being to emphasize the value of the human factor in industry. This three-day conference at a seat of learning is only another indication that we need some "humanities" to balance the purely mechanical sides of education.

Perhaps languages, history and philosophy are not so necessary as was formerly thought. But we cannot be content with a purely materialistic training that teaches us to regard machines as vastly more important than men, and natural laws as more worthy of study than human characteristics.

Coal Age greatly ventured some years ago to put a sociological department in the rear of the paper. It has been a growing feature ever since. But, meanwhile, man-making has been a progressive department at almost every factory, and the moral factors in every industry are receiving more attention.

For years it has been declared that college men of a certain class failed when they entered business, because they lacked executive qualities. They could juggle with energy and mechanism, but they could not comprehend their fellow man—for whom no formulas of breaking strain, resilience and momentum had ever been written. In fact these students appeared to have absorbed the idea that what had neither a known latent heat nor a tabulated shearing stress nor a recorded chemical analysis had no point of contact with a college man, or he would have been taught about it in the semester.

When the knitted brows of the student are lifted for awhile from the Clapeyron method of stress analysis and Du Moivre's theorem to consider something so unscientific and limited as mere man, even as mere workingman, perhaps something will happen—something wholesome and human. For after all, a science without name or syllabus can hardly make any progress. Given a designation and some consideration at a college, who shall say to what successful ends any study may be pushed? Perhaps, after this three-day consideration of "human engineering," the bookworms of the Ohio State University—and there are no more of them there than at other institutions of learning—will realize with Alexander Pope that the proper study of mankind is man.

Contract Forms

In all probability never before in the history of the coal trade has the subject of contracts been given so much serious attention as during the present year. Old contract forms, which were simply letters of confirmation of sales and were kept as a matter of record, have been pulled out from cubby holes and drawers and agonizingly scrutinized for innocent clauses that could be defined as implying direct and unqualified obligations. Many apparently harmless bits of phraseology, which some particularly stubborn customers had insisted upon having inserted in their contracts and to which the sales manager had unguardedly agreed in order to clinch the sales and humor the customers, have turned out to be veritable Frankensteins.

It is not purposed to cast any discredit upon the managers, but the fact remains that they have been indifferent to the dangers incident to an inefficient and thoughtless phrasing of their contracts. Rarely in past years, except perhaps in a few unusual cases, has much importance been attached to the wording of coal contracts, and the effect upon the sales manager was to lull him to a sense of indifference.

This soothing state of unpreparedness has been rudely shattered by the conditions created by the war, and the unfortunate manager can do nothing but lament his lack of foresight and prepare himself for the coming contract season. This, it may be prophesied, promises to be a lively and bitter one. Both dealer and customer will fight strenuously for every shred of advantage and yield as little as possible.

Sales managers who have failed to incorporate in their contracts clauses protecting them in the event of wage increases, higher mining scales, advances in freight rates from mines to tidewater loading ports, or have not made provision for the substitution of other coals in lieu of their own product, when it becomes necessary so to do for satisfactory reasons, in the event of strikes and other labor troubles, and a host of other significant points to which the unnatural conditions of today have given rise, will be sure to incorporate them in next year's contracts. Likewise, the customer will have points of his own that he will want protected by clauses in the contract. Judging from the way the situation appears now, and it is doubtful if there will be much change in it by the time contracts will be renewed, the sales manager will have the upper hand.

In connection with this subject of contracts, it seems that there might be some way to standardize a great majority of the contract forms. It is quite obvious, of course, that there are many instances where such a contract would be totally impracticable—in power plants, for instance—but to the majority of businesses such a contract form could easily be applied, and to the mutual satisfaction of both buyer and seller. A standard bill of lading is contemplated, so why not a standard contract form?

However, we may be certain that contracts will undergo many revisions before being renewed. The present strenuous year has taught both dealer and customer a valuable lesson. A contract will hereafter be given the necessary attention due such an instrument, it being far from "a scrap of paper," as so many dealers and customers have bitterly learned by experience during the last few months of phenomenal activity in the coal trade.

Department of Human Interest

Notes on Breathing Apparatus*

By James M. Stewart†

SYNOPSIS—The helmet cannot be kept tight against noxious gases. Carbon dioxide accumulates in dead spaces of helmet. A man reclining uses less than a quarter liter of oxygen per minute. When walking at 5 miles an hour he requires over 2½ liters—ten times as much.

The beginner in mine-rescue work is favorably impressed by the helmet-type of apparatus, because while in it he is able to speak and breathe naturally. As a rule, however, that confidence is short-lived. He soon realizes, when working in the smoke chamber, that it is impossible to fit the face mask tight enough to keep out the smell and taste of the smoke; and being a practical man he hesitates to trust himself to dangerous gases in an apparatus that admits so much of the surrounding atmosphere. This was my experience and that of others training with me.

In an attempt to keep out the taste and smell of smoke when wearing the helmet, members of the team used to inflate the pneumatic face cushion so much that the pressure of it often gave them severe headaches. The dead space in the helmet frequently accumulated carbon dioxide. The percentage of this gas in the helmet increases the longer it is worn. For these reasons the helmet type of apparatus is now generally discarded.

Reasons Why Helmet Should Go Out of Use

The introduction of the mouthpiece increased the safety of the apparatus. Of course in the smoke chamber it is necessary to wear goggles whenever the mouthpiece is used. These goggles do not fit very closely, but in a smoke-laden atmosphere not enough of the smoke reaches the eyes to affect them injuriously. A mouthpiece is less comfortable to breathe through than a face mask, for with the latter it is possible for the wearer to breathe through the nose.

Furthermore, it is impossible to speak distinctly through a mouthpiece, but with a little practice and the aid of signs men can make themselves understood. At first an uncomfortable flow of saliva and a dryness of the throat is experienced, but with usage this discomfort decreases, as the wearer accustoms himself to swallowing his saliva and to moistening the back of his throat.

With the Draeger apparatus the action of the injector in forming a vacuum was the cause of a fatal accident in England. This accident was investigated by John Cadman, who found that poisonous air had been sucked inward through a leak in the purifier. In the most recent Draeger apparatus the injector is placed between the expiratory bag and the purifier, so that the pressure is slightly positive in the purifier and onward to the expiratory bag, and only negative in the expiratory bag and the injector, so that if a leak took place in the purifier or in the joints connected with it no poisonous air would be sucked in.

The distribution of the caustic soda on the trays of the Draeger purifier is quite advantageous, as it presents a large surface for the absorption of the carbon dioxide and gives little or no resistance to the passage of the air. I cannot see, however, that there is any advantage to be derived in changing the oxygen cylinders and soda tins in the mine, as in my opinion no man should be allowed to overexert himself. He should be withdrawn before his oxygen and soda supplies are exhausted.

How Much Oxygen Should Each Man Receive?

I have found in actual practice that there is much difference in the quantity of oxygen required by different persons when wearing the apparatus and doing similar work. At the Brazeau station the Fleuss reducing valve is set to give 1.75 liters of oxygen per minute. Invariably this has been found to be too much. The result is that the relief valve has to be used repeatedly. Otherwise the men in training suffer discomfort from the back pressure.

If the men are not comfortable in training, they lose faith in the apparatus and would be nervous in the event of having to use it under actual rescue conditions, thus becoming a danger to themselves and to their fellows in the mine.

I suggest that 1.5 liters of oxygen be supplied to the men while training, in order to do away with the back pressure, prevent discomfort and give the wearer confidence in the apparatus. The value should be adjusted to give 2 liters per minute for actual rescue work.

The following table shows the oxygen consumed, the carbon dioxide expired, the air taken in every minute, the volume of each breath, and the number of breaths per minute for different conditions of the person whose respiration is being measured:

DATA REGARDING AIR RESPIRED WHEN WALKING AND AT REST

Condition of Subject	Oxygen Consumed per Minute in Liters	CO_2 Expired per Minute in Liters	Air Breathed per Minute in Liters	Average Volume of Each Breath	Number of Breaths per Minute
At rest in bed.....	0.237	0.197	7.7	0.457	16.8
At rest, standing.....	0.328	0.264	10.4	0.612	17.1
Walking, 2 mi. per hr..	0.780	0.662	18.6	1.270	14.7
Walking, 3 mi. per hr..	1.065	0.992	24.8	1.530	16.2
Walking, 4 mi. per hr..	1.595	1.395	37.3	2.060	18.2
Walking, 4½ mi. per hr.	2.005	1.788	46.5	2.520	18.5
Walking, 5 mi. per hr..	2.543	2.386	60.9	3.140	19.5

The figures given are for a man walking on a level without a load. The consumption of oxygen, the carbon dioxide given off and the air breathed vary greatly with the muscular exertion.

Two liters of oxygen per minute has been accepted as the standard consumption in most types of apparatus when in use in actual rescue work in mines. As the foregoing table shows that a man wearing the apparatus can employ his energies so as to consume more than two liters per minute, it is absolutely necessary for the captain of a team to see that none of his men overexert themselves.

*Abstract of a paper read before the Rocky Mountain Branch of the Canadian Mining Institute and published in its November Bulletin, 1916.

†Instructor, Brazeau Station, Nordegg, Alta.

The amount of muscular energy expended must be made to correspond to the quantity of oxygen that the apparatus is supplying. The oxygen supply cannot be regulated to suit calls on muscular energy as they may arise in the mine. Cool, calculated work is what is likely to make a man wearing the apparatus a success as the member of a rescue party.

In the Fleuss type caustic soda in the stick form is the most likely to give satisfaction. The sticks become coated with carbonate and bicarbonate of soda, which prevents the proper absorption of carbon dioxide. To avoid this, the bag should be well shaken every 5 or 10 min. The shaking rubs the sticks against one another and scrapes off the carbonate and bicarbonate of soda, thus presenting a new surface for the absorption of carbon dioxide. At the same time this shaking opens up the mass to the easy passage of air.

Cotton wool plugs should be placed in the nostrils, even though the nose clip is used. There is room for improvement in the type of nose clips now in use.

Union To Pay Old-Age Pensions

A special committee appointed by John P. White, president of the United Mine Workers of America, has been investigating the feasibility of old-age pensions for aged union mine workers. The commttee has been working for four months and is now framing its report for submission to the next biennial convention in Indianapolis in January, 1918. The document will favor the payment of old-age pensions to all union workers over 65 years of age and to disabled workmen under that age.

The headquarters of the organization at Indianapolis declares that the report will advise against the establishment of a home for aged miners. It will recommend that a per capita tax of 25c. a month be made on each of the 400,000 miners of the organization in the United States and Canada during the next five years, and that after 1923 a monthly pension be paid of $20 to all mine workers more than 65 years old.

Incapacitated mine workers under 65, owing their injuries to an accident and having no means of support, will receive the same pension if the plan is adopted. No mine worker will be entitled to a pension unless he will have been a member of the union continuously for 10 years and has paid the pension tax for 5 years. The committee consists of William Mitchell, of Iowa, John Hutchinson, of Indiana, and Evan Evans, of Illinois.

New School for Alien Miners

By George B. Pryde*

A night school for adult aliens was started at the Union Pacific Coal Co.'s mining village at Superior, Wyo., on Sept. 21, 1916, with an enrollment of 51. It is probably the first school of its kind in Wyoming. In less than 10 days 100 persons had become students, consisting of the following nationalities—Finns, Slavs, Italians, Greeks, Germans, Hungarians, Swedes and Austrians.

The school is divided into three grades, according to the schooling that the pupils have had in their native countries, and the books are "First Lessons in English for Foreigners in Evening Schools," Frederick Houghton; "Everyday Language Lessons," Markowitz & Star; "English for Coming Americans," Peter Roberts. The school term is for 100 nights, two hours a night, three nights a week. Each pupil pays $3 when enrollment takes place. If he attends two-thirds of the session, $2 is refunded, otherwise he forfeits the entire amount.

The attendance is regular and the interest in the work strong. The school board, under the auspices of which the school was started, feels much encouraged over this work. Considerable credit is due to Prof. W. R. Mathews, principal of the day school, and to the six assistants who teach in these classes.

No effort is made to make money out of the schools, the principal object being to teach the non-English speaking residents the use of the English language and to encourage them to become good citizens.

*General superintendent,, Union Pacific Coal Co. and Superior Coal Co., Cheyenne, Wyo.

Team of the Bliss Coal Co.

The illustration shows the team that won at the recent first-aid meet of the National Safety Council held at Detroit, Mich., on Oct. 20. This team represented the Bliss Coal Co.'s mine at Swan Creek, Mich., and Local Union No. 2564. There are seven men in the corps—Henry Phillips, captain; John Hatton, Edward Walton, Philip Bradley, Richard Jones, William Pettis and James Evans.

The men deserve much praise, as up to two years ago none of them had any knowledge of first-aid work. They were trained at that time by the instructors of a Bureau of Mines rescue car that was stationed at Saginaw. The team won the large silver cup presented at the County Fair in Saginaw, September, 1915, when it entered the contest against five other first-aid teams, all composed of

TEAM WHICH TOOK FIRST PRIZE AT DETROIT

mine workers. Some of the men in the several corps with which they had to compete were veterans of English and Scotch first-aid teams. Nevertheless the Bliss corps carried off first honors.

This year only three mine workers' teams contested, and the Bliss team tied for first place with the Wolverine No. 2 miners' first-aid team of the Consolidated Coal Co., Bay City, Mich. At Detroit, as stated, the Bliss team won the National Safety Council cup, thus securing United States championship honors. To obtain this it had to compete against mining and metallurgical teams from all over the country. It may be added that the judges and the officers on the floor were not Michigan men. No favoritism, therefore, could even be suggested as the cause of the award.

A big reception was held following the decision of the judges, and Mayor Marx, of Detroit, pinned the medals on the breasts of the Saginaw boys amid rounds of applause. Several unusually interested patrolmen were observed attending the meet, not at all for the purpose of keeping order, but for the sole purpose of picking up hints on bandaging, in which they hope before long to be as expert as the workers in the coal mines.

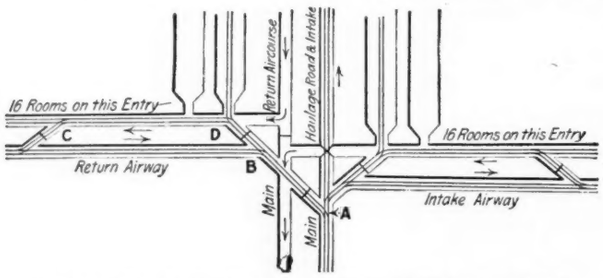
Discussion by Readers

Mine Haulage

Letter No. 5—I have been greatly interested lately in the question of economical mine haulage, particularly in the arrangement providing for sidetrack room, in locomotive haulage, and would like to suggest the method that we adopted in a mine where I was employed, by which we avoided the necessity of a sidetrack or parting for making up the trips for the haulage motor to pull out of the mine.

At the present high price for steel and copper, every foot of track and of trolley wire that can be saved is an important matter. This was particularly true in the instance that I am about to cite. It was necessary to arrange for an inside parting or provide in some other way sufficient trackroom for handling the empty and loaded trips coming in and going out of the mine. I have drawn a rough sketch that illustrates a plan that was adopted in this case.

The figure shows a portion of the main haulage road and intake and return aircourse, together with two pairs



PROPOSED METHOD TO AVOID INSIDE PARTING

of cross-entries driven to the right and left of the main road; there were 16 rooms on each entry. The rooms were driven on 34-ft. centers and were 24 ft. wide, the track being laid up the center of each room.

A feature of this plan was that the first room on each pair of entries was utilized for trackroom, for setting in the loads ready to be hauled out of the mine by the haulage motor. There was a gathering-motor working on the cross-entries. In order that the two motors should not be in each other's way, the following plan was adopted:

The haulage motor would come in with a trip of 30 cars and cut off 15 of these at the switch marked *A*. The motor would then pull the remaining 15 empties through the crossover onto the return airway on the left, so that they cleared the switch marked *B*. The haulage motor then left this trip and returned through the crossover marked *C* to the mouth of room No. 1 on the other entry. Here it picked up the loaded trip standing in No. 1 room and pulled it out through the crosscut marked *D*.

Leaving these loads in the crosscut, the motorman proceeded to do the same thing with the remaining 15 cars standing on the main haulage road. The cars were taken into the airway on the right, and the loaded trip standing in No. 1 room on the right was then hauled out through the crossover onto the main road just over the switch *A*, after which it was backed up and coupled to the loaded trip standing in the crossover on the left, and the entire trip of 30 cars was then hauled out of the mine. In the meantime, the gathering motor continued its work of gathering cars on the rooms inby of the crossover marked *C*.

This plan proved very satisfactory in the mine in which it was adopted. It saved the construction of a parting 350 ft. in length and eliminated the same amount of single track and trolley wire. Moreover, it avoided the frequent accidents that occur from flying switches, as in the old system it was the custom to fly the empties onto the parting when bringing them into the mine. In like manner, the gathering motor was accustomed to make a flying switch with the loads at the other end of the parting.

Herrin, Ill. OSTEL BULLOCK.

A "Free Lance" in Coal Mining

Letter No. 1—When reading the interesting letter of John Rose, *Coal Age*, Nov. 25, p. 899, the illustration he gives of conditions existing in mines competing in the same markets awakened some thoughts in my mind relative to the need, in the coal industry today, of a man of no fixed position, but whose duty it would be to keep a constant lookout for new ideas and new methods, the adoption of which would enable his mine to compete more successfully with other operations. He would not be simply an "efficiency engineer," but rather a "free lance."

As Mr. Rose has pointed out, the lack of adopting these new methods is often largely responsible for the failure of an operation to compete with other mines whose equipment is more uptodate or better suited to conditions both in the mine and on the market. A capable man charged with the duty of investigating and advising in regard to such new methods and equipment could keep busy 24 hr. of the day and still have work before him.

MANAGEMENT SUPPLEMENTED BY FREE LANCE

Such traditional positions as general manager or superintendent carry with them traditional duties that often allow little time to consider carefully the relative value of new practices. These must generally force themselves on the coal-mining industry by virtue of sheer merit, while an intelligent anticipation of their needs would have resulted in their adoption long before.

The use of the steam shovel in stripping operations furnishes a good illustration of how blind the coal industry often is in regard to its actual needs. Only recently, comparatively, has this important equipment come into its own in the coal fields, after having been employed in many other industries for a long period of time. It is now, however, proving its usefulness in the economical working of seams lying near the surface.

The numerous rapid improvements that are being made today in all kinds of mining equipment, call for just such a free lance to investigate and advise in regard to their

adoption. It may be a new automatic mine dump car, an improved coal-cutting machine, a new rock drill, or the latest addition to tipple equipment; or it may involve some new feature in concrete construction, or a more successful system of mine drainage, haulage or ventilation, or a safer method and more economical system of timbering, or a better system of mining. An intimate acquaintance and knowledge of these new and improved methods can only be had by continual reading, study, visiting different operations and keeping in touch with live manufacturers. Much of this new equipment may be of value but its installation and use inadvisable, in particular cases, owing to unfavorable conditions and obstacles that cannot be removed.

Assists Sales and Outlines General Policies

The free lance would prove his value to the sales department, also, in many ways. Successful selling means intelligent selling. The salesman must be acquainted with the quality and special adaptation of certain grades of coal to certain markets. The free lance may even be able to suggest a combination of grades that would prove most efficient for certain uses, although this may involve the education of consumers in the use of certain grades or kinds of fuel. Indeed, his knowledge would often lead to the working off of surplus stocks of grades that have not found a ready market. There is yet much to be done in the study of the combustion of coal in relation to its steam value.

It may not be too much to suggest that our free lance could materially assist in the management of men by suggesting certain changes or modifications in policy that have been proved of value to other companies. By watching the results obtained in the adoption of the bonus system or sliding scale, systems of promotion or methods of day and tonnage rates of payment for labor, he could often prove of great value in advancing the interests of his company. Such methods as providing suitable entertainments, clubrooms, housing, sanitation, and other efforts to better the conditions of employees, might all receive his attention, from time to time.

The preceding is merely a suggestive outline. The details would have to be worked out to suit each particular case, and those matters requiring most attention decided by the company. It is, of course, true that all the matters I have mentioned receive more or less attention in different coal companies, but in the majority of cases much that should be regarded is neglected for the want of someone whose time is wholly devoted to that purpose.

New Straitsville, Ohio. George N. Lantz.

Gathering-Motor Haulage

Letter No. 7—I quite agree with Joseph Virgin that "a mixed haulage system will produce coal cheaper than an absolute mechanical haulage," *Coal Age,* Sept. 30, p. 553. At least, this has proved to be the case in our mine, where we had to contend with numerous adverse grades; but by the use of mules and motors, our haulage costs have come well within that quoted by Mr. Virgin.

In one year, as mine foreman, I had succeeded in increasing the output of the mine here, but found myself shortly handicapped by a number of adverse grades, which at places reached 10 per cent., making it necessary to haul the coal out of some entries with block and tackle.

The output, under these conditions, began to decrease rapidly, and it was decided to install gathering motors, which was done, until we were working four locomotives and six or seven mules. A record was kept of the coal hauled by each locomotive and each mule. In a comparison of the results obtained, counting two men for each locomotive as equal to two mule drivers, the former pulled from 5 to 7 per cent. more coal than the two mules.

Experience showed, however, that a locomotive could only do efficient work when hauling for a sufficient number of loaders to make a trip without having to double back. When driving the cross-headings to the line, rooms were turned toward the solid and mules were used, the rooms being driven only to the point where they were widened out. They were then left until there were a sufficient number for the locomotive to handle the coal to advantage.

The rooms on the other entry were started from the line or boundary and worked back in the same manner, the switches being laid and the rooms driven to where they were widened out and then left for the locomotive. In this way the mule always had a short haul, but the system has the disadvantage that the necessary changes in wiring slightly increased the cost.

Steel, Ohio. Ohio Foreman.

Storage-Battery Locomotives

Letter No. 1—I have been much interested in the frequent reference to storage-battery locomotives, in the discussion of "Gathering-Motor Haulage." I agree with G. E. Alloway, *Coal Age,* Nov. 4, p. 772, that the storage-battery locomotive has "peculiar advantages" that enable it to haul more coal in the same time than any other type of locomotive now in use. I can indorse what he says, in regard to this type of motor "rapidly coming into favor" for gathering purposes.

For some time past I have been operating a George Whitcomb storage-battery motor of 4 tons. There are five of these motors in use in our mine, and they have given good results in hauling coal from the faces of the rooms and entries to the bottom. This haul will average 1,600 ft. in length, and the five motors have pulled 1,547 tons of coal to the bottom in 8 hr. A single motor, in this mine, has a record of hauling 172 cars to the bottom in 8 hr.

The mine—Jacksonville No. 6—is developed on the panel system. One motorman will gather the cars from two pairs of entries. The system may be described as follows:

No. 1 motorman will take in 12 empty cars, giving to each man on the first north, east, a single car to load. Then, passing through the inside cutoff at the head of the entry, he will gather 12 loaded cars from the second north, east, and pull them to the bottom. Again, he takes a trip of 12 empty cars into the first south, east, and gives to each man on that entry a single car to load. Passing through the inside cutoff to the second south, east, he gathers 12 loads from the men on that entry and pulls these to the bottom.

By this time, the work having consumed somewhat more than an hour, the men on the first north, east, have loaded their cars; and the motorman, taking 12 empty cars to the second north, east, distributes one car to each man on that entry and, passing through the

crosscut at the head of that entry, gathers 12 loads on the first north, east, and pulls them to the bottom. He then does the same on the south side, taking 12 empty cars to the men on the second south, east, and hauling 12 loads from the first south, east. This completes one entire round and puts 48 loads on the bottom, while giving each man in these two pairs of entries a square turn. The coal is low, and there are many boulders in the roof, which makes it impracticable to use mules for gathering cars.

My experience agrees with that of Mr. Alloway, in respect to the storage-battery locomotive being capable of hauling 30 per cent. more cars than the crab or reel motor. Besides, there are no bonds or trolley wires to be looked after. I can say that the Whitcomb battery motor, with good care by a competent motorman, will continue to gather cars for 8 hr. without recharging, under ordinary conditions. However, when contending with a long and heavy grade, they will hardly stand up more than 7 hr. JESSE HAMILTON.

Terre Haute, Ind.

Reward of Long Service

Letter No. 1—In response to the request for suggestions as to what one would do if he were placed under circumstances similar to those described in the inquiry in *Coal Age*, Nov. 4, p. 776, I will say that every man should stand entirely on his own merits when looking for advancement. An honest man will not seek preference through political pull or relationship, or anything else other than his own ability and efficiency in the handling of men.

Conditions at all mines would be much improved if advancement was based wholly on a man's merits and capability. If such a system was adopted, and not departed from in any case, the result would be that each man would have an incentive to strive for promotion and he would seek to better his conditions. There would be greater efficiency in every department of the mine. Better work would be done, more would be accomplished, and, I believe, fewer accidents would happen in a given time.

A Promise Made Should Never Be Broken

The particular instance mentioned in the inquiry places the official who was responsible for the failure to reward the long, faithful and capable service of his employee in an unfortunate position. No official should make a promise to a man working under him, without fulfilling that promise. The failure to do so will lower him in the eyes of his men, who will lose confidence in him and take no interest in their work.

The employees are furtively watching all the officials of their company to discover, if possible, their attitude toward the men and, particularly, toward themselves. Faithful service justly rewarded will often prove of great assistance to an official in overcoming the many difficult tasks that confront him.

In this day and age of education and enlightenment, the old habit of officials to curse and bully their men is fast passing away. The successful foremen and superintendents today are those who are thoughful and cool-headed and who study each situation carefully in the treatment of their men. The reason for this change is easy to perceive, since any other treatment always results in an inability to retain good men in their employ for any length of time.

Faithful service today quite generally meets with reward sooner or later. Where the officials of a mine show that they appreciate faithful service there is sure to be found a better class of workmen in their employ.

Hooversville, Penn. J. H. TIPTON.

Letter No. 2—The case cited by "Dee," *Coal Age*, Nov. 4, p. 776, cannot fail to interest many readers who occupy mining positions that they have held for a number of years—often with a forlorn hope of advancement, which they naturally feel is due them. In giving the advice requested in this inquiry, one must place himself in a like position and consider how he would act under the circumstances.

We learn that the man "Dave" had an ability that was recognized by his superior officers, since a careful canvass singled him out as the man best fitted for the proposed work. It is further stated that he performed this work with entire satisfaction to the company and credit to himself, in less than the allotted time. This achievement would naturally give him the right to expect further recognition, which we understand was practically promised to him. Great must have been his disappointment, later, when he learned that the new position was filled by another—a man of inferior ability but who, through some relation, succeeded in securing the place.

Inclination Natural To Seek Another Place

Under such circumstances as these, my inclination would have prompted me to arrange, if possible, for a personal interview with the superintendent or manager responsible for such treatment. While I would approach him calmly and with tact, I would be determined to ascertain my present standing and future prospects in the company. I feel sure that any fair-minded general manager or superintendent when properly approached in this manner would be able to explain the treatment I had received and would, perhaps, make amends for the same by a promise of consideration in the future. Failing in this, however, one would naturally be inclined to consider seriously the advisability of seeking a place with another company.

But, before acting on such a resolve, it would be wise to consider what such a change would mean. Perhaps, Dave was getting up in age, in which case it would be a matter of policy on his part to accept the situation, bury the feelings that had arisen and endeavor to show by his work that he still merits recognition. To start in with a new company at an advanced age, one might find when it was too late that his new employers followed the same policy, and he would not then have the same claim for recognition that he possessed with his former employers, because he is a newcomer and must take his chances with the rest.

It is seldom that a man has much to gain by seeking another place every time he thinks he has not had a square deal. It is often better to stay and take chances with those who know you and where you are surrounded by many friends on whose sympathy and coöperation you can rely, than to start the struggle again among strangers. Therefore, I would not advise Dave to quit his place.

Alientown, Penn. J. W. P.

Coal-Mining Examinations

Letter No. 6—The letter signed J. W. P., *Coal Age*, Oct. 28, p. 729, describing the writer's experience in attempting to secure a certificate of competency in Colorado, possessed an unusual interest for me by reason of the fact that I have been similarly handicapped in Pennsylvania.

The bituminous-mine law of this state, Art. 24, Sec. 4, specifies that "applicants for certificates of qualification as mine foreman and assistant mine foreman shall be citizens of the United States . . . and shall have had at least five years' practical experience, after 16 years of age, as miners or mining engineers or men of general work, inside the mines of Pennsylvania."

It has always puzzled me to know how Pennsylvania legislators were justified in the enactment of such a law. Surely no one will seriously contend that the conditions in the bituminous mines of this state are so exceptional that a practical mining man from another state or country will require to be put on probation for five years in Pennsylvania mines before he can receive a certificate of competency from the state mining board.

Candidate's Experience in Pennsylvania

I hope I may be pardoned for referring to my own experience in this line, having worked 29 years in coal mines, 17 years of which were spent in the gaseous mines of Scotland and 12 years in nongaseous mines in this country. I have mined coal by hand in both the room-and-pillar and the longwall systems of mining, besides shooting the coal off the solid, which is a science in itself. For 10 years I was employed on stumps and pillar work and at other times have been engaged in timbering, rock work and general labor around the mine.

At the present time I am performing the same work that I would if I acted in an official capacity, from which I am debarred, however, by reason of not having a certificate because I have not served the required length of time in Pennsylvania mines.

Now, I am no advocate of a noncertificate law. On the contrary, I believe that the man who studies hard enough to qualify himself for a certificate is a far more valuable man than the one who contents himself with his long experience in mining, and I consider the former is entitled to preference. I believe I am not alone, however, in the opinion that the five-year probationary period required by law in this state is excessive and should be modified in favor of the man who gives satisfactory proof of his practical experience under conditions similar to those that obtain in the bituminous mines of the state.

At this time, I have worked in Pennsylvania mines for three and a half years, and must still continue eighteen months longer in the same unofficial capacity, before I can try for the coveted indorsement of the state mining board. I cannot but express the hope that others will take part in this discussion and express their opinions frankly before letting the matter drop. John MacNicol.

Seanor, Penn.

Letter No. 7—I do not fully agree with Thomas Hogarth when, speaking of the character of the questions asked in coal-mining examinations, *Coal Age*, Nov. 4, p. 772, he appears to ridicule the asking of questions that would involve a working knowledge of mining equipment, such as coal-cutting machines, mine telephones, gathering motors, etc. I quite agree with him, however, that a mine foreman should have such a knowledge of geology as will enable him to give needed instructions to the men in his charge, in respect to the many dangerous conditions that are often not well understood.

Let me assume, for example, that a cutting machine runs hot at a time when the machine boss is away and the mine foreman present is unable to give any instructions to the machine runner, who may be a new man. As a result, the machine must stop cutting coal or there will be a chance of its being injured. Had the foreman a little knowledge of the machine he probably would be able to remedy the trouble, and there would be no delay.

Suppose, again, the foreman is in a hurry to telephone the surface or another part of the mine, but finds the instrument out of commission. Perhaps a little knowledge of the connections and other parts would enable him to correct the trouble in a few moments. Otherwise, he must send a messenger for a man to repair the phone or have someone carry the message he wishes to send.

In order to avoid these delays, which would not occur had the foreman a slight knowledge of the working of the different equipment used in the mine, I believe it is important that every foreman should be acquainted with these details and that questions in the examinations bearing on these points would not be amiss. I also believe that if a mine foreman cannot, himself, lay a 60-lb. switch, he will not be able to instruct his tracklayer how to do it, or to tell when the work has been properly performed.

In a few words, let me say that I believe a competent foreman should be able to do every class of work performed in the mine, and it is an important part of the examination, in my opinion, to ascertain if candidates have this knowledge of the details of mine equipment. No examination thoroughly covers the ground unless it contains questions pertaining to every kind of mining work.

Oliphant Furnace, Penn. John H. Wiley.

Bonus System in Mining

Letter No. 3—Speaking from the standpoint of a miner, kindly permit me to say that I cannot agree with the suggestion that the bonus system can be successfully applied to coal mining. Several reasons convince me that this opinion is correct and that any attempt to apply the system in a mine will at once lead to dissatisfaction on the part of the mine workers doing different kinds of work or performing the same work under different conditions.

In the first place the offering of a bonus to a motorman for hauling a larger number of cars to the shaft bottom than a certain fixed average would have a tendency to increase the number of accidents from haulage. As soon as a motorman realizes that he will receive a certain percentage, or bonus, in addition to his accustomed pay, if he exceeds his regular haul, he will make every effort to do this and run many chances. It is this haste and disregard for safety that causes many accidents.

The same may be said of a miner who is promised a bonus for all the coal he can load beyond a certain tonnage per day or per month. Like the motorman, the miner will take chances and run many risks, endangering both himself and his helper, in order to load a large number of cars each day. He will be very apt to neglect setting the necessary posts to make the place safe, before proceed-

ing to load out his coal. He will take the chances of a loose piece of rock falling that should be taken down or made secure by a post. The neglect of these precautions will greatly increase the number of accidents at the working face.

Again, it must be remembered that conditions are not the same in the different working places in a mine. One man will be working under a bad roof or be troubled with clay veins or water in his place, while another man has a good, clean coal, a fair roof and no water to bother him. It is easy to see that these two men are not working under equal conditions, and the one last named will certainly produce the larger amount of coal with less effort in the same time, although he may be no better miner than the other man, who must contend with conditions that delay the work. The bonus made by the one will naturally cause the other much dissatisfaction and give him good ground for complaint.

It has been suggested that a plan could be worked out to suit these varying conditions, and I should be glad to hear suggestions of how this can be done. A MINER.

Horning, Penn.

Shortage of Labor in Mining

Letter No. 11—While it is possible to give many reasons for the present shortage of labor at the mines, the conditions vary so widely in different localities that it is necessary for each superintendent or foreman to locate his own difficulties and adopt some measures for overcoming them. This is the all-important question.

It may happen that a mine is located, perhaps, 5 mi. from a railroad station and the miners living close to the mine are unable to get out for a visit or for the purchase of goods not kept at the company's store, without great inconvenience. The trouble is all the greater when a hackman charges an exorbitant fare for taking passengers to the station; or the company's store sells its goods at greatly advanced prices. It is no wonder that men do not choose to live in such a place where they are robbed at every turn.

GOOD SCHOOLS AND CHURCHES NEEDED

Another objectionable feature found in some mining towns is the absence of any good schools near at hand where the children can attend regularly in all kinds of weather. Frequently, also, there is no church in the place, unless it may be a Catholic church.

It is a fact that, in many cases, no attention is paid to either the spiritual or temporal needs of the employees. It is no wonder that miners do not care to bring up their families under such conditions. A mining town should have one or more churches, both Protestant and Catholic, and a good school near at hand where competent teachers are provided. The company's store should sell goods as cheap as or cheaper than they can be procured elsewhere. If the mine is located at a distance from the railroad station, it would be well for the company to run a hack or motor car to and from the station for the convenience of its employees who must go and come occasionally to supply the needs of their families and for social visits outside the town.

I have known mines where the conditions for work underground were not favorable; but there was no scarcity of men, because the town was a good place in which to live. On the other hand, there are mines where the conditions underground are favorable, but there is no good place to live or bring up a family. The children must play in dirty streets, learning to swear, play poker and even to drink, while the houses are poorly kept and have no gardens and there are no nearby schools for the children.

Let me suggest, in closing, that conditions underground should be made as favorable as it is possible to make them, so that the men can earn good wages. Wherever practicable, two men should be given two places, so that they can load coal in one place while the machine is cutting the coal in the other. Men should not have to wait for cars or material. All dead work should be paid for promptly each pay day. The docking system to prevent the loading of dirt with the coal should be fairly managed.

It is better to spend a little money to keep a good class of workman in the mines than to be at a large expense, owing to a shortage of men at a time like the present. Keep the men good natured and urge them to work together and assist each other, as this is for their interests as well as the company's. Where these conditions prevail, few men will care to change and go to another place.

Ohiopyle, Penn. MINE FOREMAN.

Letter No. 12—I am greatly interested in the question of the scarcity of labor, because this matter has troubled many mines, recently, in this coal field. However, I am sure that there is always less to be feared from this cause if the mine foreman treats his men rightly.

A foreman should pay as much attention and try as hard to make things pleasant in the mine as he does in his own home. Make every effort to satisfy your men. Attend promptly to their complaints. Treat every man as you would like to be treated yourself. Do not lose your temper, but give every man a satisfactory answer and do not promise him something only to get rid of him. Be sure to fulfill every promise.

When a mine foreman is making his rounds and finds a miner about finishing his place, he should try and arrange for another place for him, so that the man will lose no time. The foreman should give particular attention to see that all needed material is promptly sent in to the men as it is ordered. If a miner has performed dead work that was necessary, the foreman should make a generous allowance for the same, and not let his men get the idea that he is not treating them fairly. When there is trouble in a man's place that you cannot fix up at once, and you know he is depending on his daily work, try and give him a chance at some other work until the trouble can be removed.

In all his treatment of men, a foreman should maintain a firm discipline. Both foreman and superintendent should work together on this line. The men should understand that whenever the foreman answers "Yes" or "No" to a question, his decision is final. Where these suggestions are carried out, I cannot understand how men would leave a place for such trivial causes as were mentioned by Ostel Bullock, *Coal Age*, Sept. 23, p. 514, where he says that one man left because his groceries did not reach him until the day after they were ordered; and another man, because his children could not agree with the children of another employee. When men leave a mine for such small matters as these, I think there must be something wrong underground.

Chambersville, Penn. ASSISTANT FOREMAN.

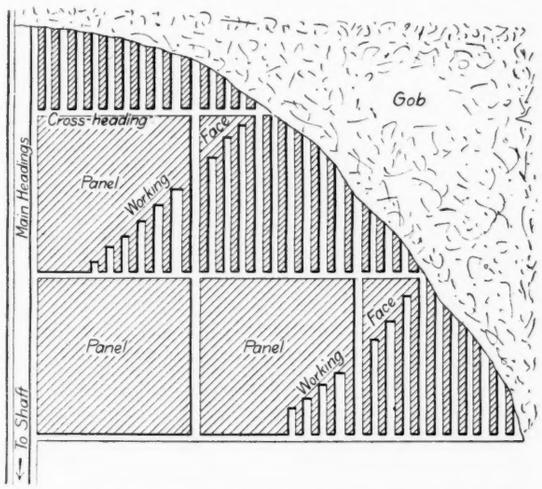
Inquiries of General Interest

Timbering After Machines

I want to ask a practical question of the readers of *Coal Age* who have had experience in timbering. The mine foreman and myself are practical mining men and claim to understand roof conditions thoroughly. My own experience in coal mining extends back 22 years.

Our coal is all mined by machines and for some time past we have been using a method in timbering after the machines that has given good results and considerably reduced the cost of production, by reason of the fact that it eliminates the necessity of a helper for the night timberman. Recently, however, we have received an order notifying us to discontinue this practice.

The coal in this colliery is mined on the shortwall system, being divided by cross-headings into panels, which are worked on the retreating plan. As shown in the accompanying figure, the cross-headings are turned off



PANEL WORKING ON THE RETREATING SYSTEM

the main roads at right angles to the same about 250 ft. apart and driven to the limit. These are connected by butt headings, at regular intervals, to complete the panels. Owing to a bad drawslate, narrow rooms or stalls are turned at right angles off the cross-headings and driven on 25-ft. centers for a distance of 250 ft., the total rise being 80 ft. The panels are worked out successively on the retreating plan.

In regard to timbering after the machines, the drawslate has previously given us much trouble. Experience showed, however, that it was necessary to crossbar every 4 ft., using 10-ft. collars supported on two posts or legs. The timbering was a considerable item of expense until we devised the plan that I have mentioned as not requiring a helper for the night timberman. The plan we adopted is as follows:

The 10-ft. collar was first supported on a single post set about 14 in. from the wide end of the timber, and was held secure by driving a good wedge under that end of the collar, between it and the roof. The effect of driving the wedge under the wide end or butt was to make the smaller end of the collar bear firmly against the roof, thus holding the stick securely in place until the night timberman came around, whose duty it was to set another post under the unsupported end, which he could do single-handed or without a helper.

In the use of this method of timbering we have never had an accident, and in our opinion it is satisfactory and entirely safe, having always given A-1 results. Previously to the adoption of this system of timbering, the night timberman was obliged to have a helper to assist him in setting the second leg under the crossbars.

The order to which I have referred, directing the discontinuance of this form of timbering, instructed us to cut a small hitch in the coal to hold the other end of the timber, instead of relying on the wedge at the wide end of the stick to hold it in place. Of course, we were compelled to follow these instructions. But, after making three or four cuts in the coal and setting the timbers, we found that we had to return and stand the second post under the other end of the collar, as the stick did not serve to hold the frame securely.

Not only does the cutting of the hitches in the coal increase the work and expense of timbering, but that system actually increases the danger to the miner, the driver, and all in the mine. The danger develops when the coal breaks away from the rib, and it is necessary to move that coal before setting the second post. We shall be glad to hear from some practical timbermen and get their opinions on this question, in regard to the best methods to employ with a view to both safety and economy.

JOHN. H. WILEY.

Oliphant Furnace, Penn.

[We hope that this inquiry will receive the attention that it deserves, as it involves a close study of the conditions under which the work must be performed and the nature of the roof strata. It should be remembered that the work, in this case, is on the retreating plan, and that the gob or waste is behind the receding faces of coal. It is worthy of note that the roof subsidence continually taking place acts to bind the timbers tighter when wedged in the manner described by this correspondent. The effect of this is to cause the crossbar to act as a cantilever when supported on a single post set about 14 in. from the wide end.

It is quite possible that this scheme, which was evolved out of a long experience in supporting a bad drawslate, may be the safest and best method to adopt under such conditions. Let us hear from good timbermen, and if a better method can be suggested, it will be gladly received and, we do not doubt, will be given a fair trial to ascertain its value. It frequently happens that the men directly engaged in the work of timbering or mining under difficult conditions are better able to judge of the plan or methods they adopt than one who sees the work from a distance and has not had the benefit of the actual test—Editor.]

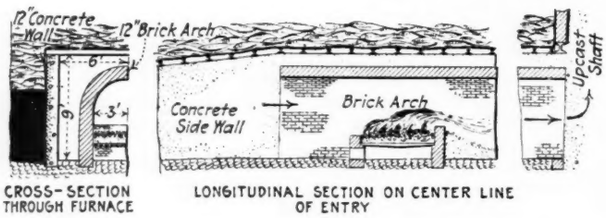
Examination Questions

Alabama Mining Examination, First-Class. July 24-27, 1916

Ques.—Describe a ventilating furnace and tell how and why it produces an air current.

Ans.—A mine ventilating furnace is constructed under a brick arch built in the airway at the foot of the upcast or furnace shaft, as illustrated in the accompanying figure. The furnace itself consists of grate bars set in a firebrick foundation at a distance of 15 or 20 yd. from the foot of the shaft. The walls and arch surrounding and back of the furnace are also of firebrick, and the lower portion of the shaft is lined with fireproof material.

As shown in the figure, a space is left on each side and above the arch, separating it from the concrete side walls and the steel I-beams supporting the roof. The air current passing through this space keeps the side walls and roof of the entry fairly cool, while a large portion of the



SHOWING CONSTRUCTION OF MINE FURNACE

current passes under the arch and is heated to a high temperature by the fire before passing up the shaft.

The heat of the furnace thus imparted to the air in the upcast shaft expands its volume and renders it lighter than the cold air in the downcast shaft or the outside atmosphere, and this lighter air in the furnace shaft is forced upward by the greater weight of the air in the downcast or the outside atmospheric column, as the case may be.

Ques.—Describe a blower ventilating fan, and tell how and why it produces an air current.

Ans.—A blower, in mine ventilation, may be either a disk or a centrifugal fan. The vanes of a disk fan, like the blades of a centrifugal fan, are mounted on radial arms supported by a central axis or shaft, but the vanes of the former are inclined to the plane of revolution, while the blades of the latter are normal to the same plane. The revolution of the disk fan propels the air forward by the action of the inclined vanes. On the other hand, the revolution of the air within the blades of the centrifugal fan generates a centrifugal force that drives the air out from the center toward the circumference of the fan, where it is discharged into the fan drift and passes through the mine.

Ques.—Describe a suction ventilating fan and tell how and why it produces an air current.

Ans.—As far as producing the current is concerned, the action of either a disk or a centrifugal fan is the same whether blowing or exhausting. In the case of a disk fan, the direction of revolution must be changed, in order to convert a blower into an exhaust fan. In a centrifugal fan this is accomplished by changing doors fixed in the fan drift, in such a way that the air from the mine is drawn into the center of the fan from which it is discharged into the fan chimney and passes out into the atmosphere.

Ques.—What difference does it make whether the travelingway, through which the men enter and leave the mine, is an intake or an outlet for the mine ventilating current?

Ans.—If the mine is generating gas in considerable quantity, men should not be permitted to travel the return airway for fear of igniting the gas in the return current. Assuming, however, no gas is present, it is better for the return airway to be used as a traveling road in preference to the intake, because the dust of travel would not then be carried into the mine.

Ques.—What is a "booster" fan, as used in a section of a mine, and what are its advantages and disadvantages from a safety standpoint?

Ans.—A booster fan is a small fan installed in a mine at a point where the circulation is slack, its purpose being to urge forward the air current in that section. Under certain conditions, where the mine workings have been extended to a considerable distance and the air sweeping the working face is insufficient owing to leaky stoppings, the installation of a booster to assist the circulation of air in certain sections has proved of advantage as a temporary means of remedying the trouble.

The booster has practically the same effect in distributing the air in the mine as a regulator, without offering the resistance which the latter produces. It can be made to draw the air that would otherwise enter one section of the mine and force it into another section. The disadvantage of the booster fan is that it requires constant watch and attention, which it does not always receive from the men working in the mine. In case of accident in the mine, the location of the booster will generally prevent access to it for the purpose of starting or regulating its operation. Also, it is more subject to injury on this account. From a standpoint of safety alone, the booster fan cannot be recommended for producing circulation, except for temporary purposes. Its sudden failure to operate if not quickly observed might cause a serious disaster in a section of a mine generating explosive gas.

Ques.—How would you proceed, with safety, to reenter a heading after an explosion had occurred therein?

Ans.—Assuming no breathing apparatus is employed, ventilation must first be restored in the heading, which must be entered with the intake air. Proceed slowly, giving the air time to sweep out the gases produced by the explosion. It may be necessary to use a temporary brattice if the stoppings have been destroyed or are leaking badly, unless the same can be repaired quickly. Only safety lamps should be used, and frequent tests must be made of the air to ascertain that it is safe. No advance must be made ahead of the fresh-air current.

Book Reviews

A Standard Economic Geology

ECONOMIC GEOLOGY—A Textbook for Students and a Reference Book for Engineers, Geologists and Chemists. By Heinrich Ries, professor of geology, Cornell University. Fourth edition. Pp. xvi + 828 + 28 index; 6x9¼ in.; 291 figures; 75 plates. John Wiley and Sons, Inc., 432 Fourth Ave., New York City, publishers. Cloth boards. Price, $4 net.

This is the fourth edition of a book that has already received the approval of the public. It is not a mere reprint, however, because it has been enlarged and revised so that account could be taken of the new developments in the economic geologic status of the country. Moreover it takes Canada into consideration, and brief accounts of the deposits in some other foreign countries are given. The statistics are brought up to date, and many additional illustrations add their interest to the text. Especially have the chapters on ore deposits received enlargement.

Coal receives the first 69 pages, and the treatment is quite satisfactory and authoritative, the illustrations being mostly informative maps and cross-sections. An interesting table shows the occurrence of coal—anthracitic, semi-anthracitic, semi-bituminous, bituminous and lignitic—in point of geologic time in the various states and territories of the Union.

In turn all the nonmetallic and metallic deposits are considered, with due condensation and appropriate selection of material. The author plays no favorites, except Petroleum, Natural Gas and other Hydrocarbons, to which he awards 68 pages, or almost as much as he devotes to coal.

Signpost for Coming Engineers

ENGINEERING AS A CAREER—A series of papers by eminent engineers. Edited by F. H. Newell, professor of civil engineering, University of Illinois, and C. E. Drayer, secretary, Cleveland Engineering Society. Pp. xii + 214; 5x7 in.; no illustrations. D. Van Nostrand Co., 25 Park Place, New York, publisher. Cloth boards. Price, $1 net.

Most coal-mining engineers will think it is not by chance that mention of their craft is omitted in this book. It is a distressing fact that it is left out almost everywhere. Bitterly they complain that this is true of the American Institute of Mining Engineers and the Canadian Mining Institute. You have to go to Great Britain, where there is little mining but that of coal, to find an institution that covers mining generally and does not look despitefully on coal, rather favoring it above all other minerals.

Though this work overlooks the coal technician, it holds out hope to him in its advocacy of technical training and its promise of the ultimate triumph of the college graduate. Some of us will say here that this book seems to tell how it ought to be—how indeed we hope it will be—rather than how it is. If mining engineers are to be cramped by a management which scorns improvement, then indeed a college education is a misfit, just as a school training is a disadvantage to a man who has to work for a boss who spells business "biznes" and cannot write a grammatical letter. There is no hope for the technical man till he has managed to place technical men in power, and the time is coming apace, for anyone but a college graduate is at a difficult pass to handle modern equipment.

The untrained men will have a still harder time tomorrow, for the men with education are slowly being borne to a restful haven where technical training is no longer needed. There is a rest for them there as profound as that in the early days, when the swing of the whip, the twist of the handle of a shovel, a certain deftness in hitting a wedge were all the arts there were in mining. Being well-built men and hearty they learned such matters easily. At first they resented the foreman's examination and that demanded of the fireboss, but there was worse yet to come. The worst that they can look for will have arrived when coal mining is not merely a producing but a manufacturing business, creating from the bituminous earth electric power and byproducts.

The number of unlettered men in the profession has kept coal mining in its swaddling clothes. The untrained man objected to all complications he could not meet and handle. He has sensed a condition where he would be at a disadvantage, for, as he would not attempt to run a machine shop, so also he would not undertake to turn his familiar mine into one, and thus create difficulties for solution.

The need of technical men has been to be placed under the authority and control of technical men who could utilize what their subordinates knew to good advantage and could develop their skill by continuously calling on it. Just as sights in a mine were useless as long as men could not follow their indications, and blueprints mere folly as long as the manager refused to use them, so all "book learning" is an encumbrance if those in control will not use it. The technical man will have no place till the feet of those who have carried out the entirely unschooled carry out also those who have a common-school education only.

Mining receives 15 pages in this book, there being two articles, one entitled "Mining," by F. B. Richards, and another "Opportunities for a Mining Engineer." Both look upon mining as applying to other minerals than coal, though their intention is to embrace the whole field. The departments covered are Mechanical, Railway, Hydraulic, Metallurgical, Electrical, Chemical, Iron and Steel, Marine, Sanitary, Municipal, Bridge, Architectural and Mining Engineering, Mining being last. There are other chapters on "The Engineer and His Profession," "Shall My Boy Become an Engineer?" "Lure of Private Practice," "Vocational Guidance," "Scientific Manufacture and Its Opportunities," "Incomes of Technically Trained Men," "Technical Man in Business." The authors handle their respective subjects ably; the advice is as good as can be given, and it is a profitable book for those to read who desire guidance in selecting a career.

Let a few words by Ernest McCullough, of Chicago, on consulting engineering be quoted as a sample:

> The field of the consulting engineer is limited. The lawyer and the medical man enjoy the benefits of being engaged in work for which there is constant demand, for until men think straight and act straight the lawyer will be busy, and until men live straight and cultivate a proper feeling of community interest the medical man will never lack patients. . . . The engineer's services are required only when men build or plan to build. . . . He is busy when capitalists are spending money, and he rests when they lock up their funds to await a time when it will pay better to invest in new enterprises than to let money lie idle. . . . It is not uncommon for a good engineer to be out of employment for a whole year. The writer knows first-class experienced engineers out of employment who have not earned a month's pay for nearly two years.

The Who, Which and Where in the Coal Industry

THE MINING CATALOG COMBINED WITH THE COAL FIELD DIRECTORY for the year 1916. Pp. 786, 9x12 in.; illustrated. Consolidated Keystone Publishing Co., inc., 302 Penn Ave., Pittsburgh, Penn., publisher. Cloth boards.

The Coal Field Directory comes out this year with a new name—"The Mining Catalog." In the portly volume that the industrious energy of the present owners has developed, the former directory will hardly be recognized. Still it is a pity that in these days of its greater prosperity and larger usefulness the name under which it has grown has been pushed almost into the discard. It is to be hoped that the evolution will not go any farther—it has gone from pages of directory in bold type and a sparse ring of advertisements in the margin to pages of directory in fine type and the advertisements in the front of the book with all the advantages of display. Let us hope that the survival of the fittest will not end by the entire exclusion of the directory of mines, the very germ of the enterprise.

Fortunately, that mining list is getting better every year. It is really a most creditable performance. Stretching from page 621 to page 786, it is replete with information, easy of reference, complete, systematic and well chosen. Of course, there might easily be more information added, for our desires are insatiable, but it is perhaps unreasonable to ask for any more. The editors know just how far they can go with regard to their pocketbooks in furnishing the information that is so much in demand. The catalog and the engineering data that accompany it, both of much interest, now together occupy 610 pages. Some care has been taken to induce the advertisers to write copy of an informative character.

Coal and Coke News

Washington, D. C.

W. W. Atterbury, president of the American Railway Association, has announced the creation of a special committee, known as the Conference Committee on Car Efficiency, representing the American railroads, which will take active charge of the car shortage situation and attempt to bring about some adequate relief. This commitee will hold its meetings in this city and will coöperate directly with the Interstate Commerce Commission on the car shortage question. Mr. Atterbury announced that in order that the public may know of the steps taken by this committee, it will issue bulletins from time to time for the information of the shippers and communities.

Instructions to all the railroads of the country at once to return to their owners all open top freight cars, either loaded or empty, were issued by the conference committee. This class of equipment is composed largely of cars suitable for hauling coal. To insure the carrying out of this order, railroads were asked to bring these instructions to the attention of all railroad officers and employees who have anything to do with directing the movement of cars.

For the information of the conference committee and the Interstate Commerce Commission, all roads have been requested to send to the special bureau which the carriers have just opened in this city copies of all orders issued to comply with the committee's instructions.

The Conference Committee on Car Efficiency, which was appointed by the American Railway Association, will remain in session in Washington until some real relief has been secured from the car shortage. The members of this committee are: George Hodges, chairman, E H. Coapman, vice-president of the Southern Ry.; W. L. Park, vice-president of the New York, New Haven & Hartford R.R.; C. M. Sheaffer, general superintendent of transportation of the Pennsylvania R.R., and W. A. Worthington, vice-president of the Southern Pacific Co. They will be in daily consultation with Commissioner McChord, of the Interstate Commerce Commission, with whom the railroads are coöperating to relieve the car shortage situation.

One of the first attempts made by the railroads to force a measure of relief of the car shortage is to be subjected to an investigation by the Interstate Commerce Commission. The commission has suspended from Dec. 1 and later dates, until Mar. 31 next, certain schedules proposed by the railroads operating in Official, Southern and Western classification territories which would increase demurrage charges. Before these increased charges go into effect the commission will first decide as to their reasonableness.

The present demurrage charge of practically all railroads is $1 per day per car after the expiration of the so-called free time. By increasing this charge the roads seek to bring additional pressure to bear upon shippers to unload early and release equipment without delay.

One means for preventing a reoccurrence of car shortage and stagnation to business was suggested to the Newlands Joint Congressional Committee which is now engaged in investigating the railroad problem. This suggestion was made by Alfred P. Thom, who has charge of marshaling the railroad witnesses before that committee. It was in substance that the interstate railroads be relieved of state regulation and discriminatory burdens imposed through state regulation, and that the sole control and regulatory power over such railroads be delegated to the Interstate Commerce Commission. So long as the present system of regulation exists the railroads will be laboring under a heavy burden and investors will refuse to extend them credit.

To maintain the roads of the United States in an adequate condition, without attempting to make extensions of lines, will require annually new credit to the extent of a billion and a half, said the railroad witness. If a multiplicity of regulatory powers is to be permitted it will be impossible to command this large credit, which will mean a contraction in equipment, a check on commerce and higher freight rates. Mr. Thom said:

"As I read the needs of the public interest they are that the public be assured of adequate facilities now and in the future on reasonable terms, but if conflict comes between facilities and high rates there would be no dissent that the public interest requires that first consideration be given to the provision of adequate facilities."

Mr. Thom said that the threatened strike situation during the last session of Congress and the present agitation over car shortage are proofs of the public's primary, pressing demand that facilities of transportation be provided and that the lines be kept in constant operation.

"The fundamental and essential interest of the public is whether an adequate transportation facility is provided not only for the present but for the future," he said.

Recent history has provided signs of menace to transportation facilities, Mr. Thom continued, saying that the "panic of plenty" in 1907 arose from a situation where the railroads were offered increased business but were without facilities for handling it.

"A panic was brought on because communities did not have facilities to communicate with one another. There was congestion everywhere Have we forgotten the embargoes of last spring due to a lack of yards and terminals?" he asked. "The situation remains unremedied to this day because of a lack of yards, terminals and other facilities."

As a result of the existing situation, Mr. Thom pointed out, fewer miles of new lines were constructed during the past year than in any year since 1848, excepting the Civil War period. He adverted to the fact that both anti-trust laws and low tariff have been tried as a curb for the increasing cost of living.

"The cost of living is still advancing," he commented. "Is it not rather a fundamental question of supply? There are fields, mines, forests yet to be developed. Yet with this problem before us we have by some force put a stop to the construction of railroads into new and undeveloped territory. Can we conclude that the public has adequate transportation facilities?

"Railroad construction has not stopped at a point of equilibrium, where communities have equally good service but where there are patent differences. While there are 30.80 miles of railroad per hundred square miles of area in New Jersey, there are only 1.94 miles in Wyoming, 11.75 in Virginia, 12.65 in Georgia, 3.35 in Idaho and an average of 8.53 miles throughout the United States.

"Will the people be satisfied with statesmanship which halts facilities at that point of inequality?"

Mines Should Be Prepared

A plea for preparedness at coal and metal mines, so that if a disaster comes and imprisons miners the officials may have a definite plan for action in saving life, is outlined in a report just issued by the Bureau of Mines of the Department of the Interior and which is being sent to practically all of the mines in the United States. The Bureau of Mines has aided in rescue work at many mine explosions, but in almost every instance where there has been a great disaster the bureau's officials say they have found great confusion prevailing, with much valuable time wasted before a proper rescue organization couid be effected. There has also been a serious absence of the equipment necessary for the recovery of the men entombed. Lack of such preparedness, the bureau says, no doubt has often resulted in an unnecessary loss of life among the imprisoned men and also among the rescue force.

Since the bureau began its rescue work it has endeavored to guide in the formation of competent rescue organizations at mine disasters, but has been greatly hampered because of the different methods in practice in different parts of the country. Based on its experience at many mine disasters, the bureau has now formulated a code which it is felt should be in the hands of every responsible mine official. This code provides for an organization at each mine that would become automatically active the moment a disaster occurs. It also gives a list of the necessary materials to have on hand at all times and outlines the most important duties for the various organizations during such emergencies.

According to Van H. Manning, director of the bureau, "At times there has been some little misunderstanding as to just what part the Bureau of Mines is expected to take in rescue work.

"This manual is intended to define the duties of the rescuers and to bring about a better understanding between the men engaged in rescue work as to the functions of the bureau. It has been a popular notion that the rescuers of the bureau wearing heavy oxygen rescue apparatus should carry the dead from the mine, and there has been some little disappointment at the refusal of the rescuers to take part in this work. It has been my policy that the rescuers should seek to save live men and give them assistance, and should not be called upon except in special emergencies to carry bodies, and then only for a short distance. The entire strength of the men, thus handicapped by the heavy apparatus, should be expended in saving life.

"Disasters do not come frequently to individual mines and there has been a natural feeling that they will never come. Consequently little thought is given to what should be done when such a catastrophe does come The result has been little preparedness and considerable confusion, especially when some of the best men in the employ of the company are imprisoned or killed. This manual is intended to give the operators and superintendents and other officials of the mines some idea of the character of organization that should be normally in force at a mine every day it is working, and explains how this organization may be turned into an effective rescue force when a disaster comes. It is an effort on the part of the bureau to save the maximum possible number of men imprisoned in a mine and at the same time to safeguard the lives of the rescuers, many of whom have been sacrificed in the past. The bureau does not like to think of disasters happening; at the same time it believes in preparedness when they occur. If the suggestions in this little book succeed in saving the life of a single miner, the bureau will be repaid for its efforts along this line."

HARRISBURG, PENN.

Indications that the consumer will not get that "$10,000,000" collected by the coal companies in the shape of a tax levied from 1913 to 1915, and later declared unconstitutional, were furnished on Nov. 25 by ex-Judge Robert S. Gawthrop, chairman of the anthracite commission apointed by Governor Brumbaugh to investigate the levy and return of the tax.

Judge Gawthrop declared that as a result of public hearings covering four months it was learned that the dealers had absorbed this tax themselves and had not passed it on to the consumer.

The question put to Judge Gawthrop arose from a statement from Edward W. Parker, director of the Anthracite Bureau of Information, Wilkes-Barre, to the effect that the coal operators had refunded 90 per cent of the tax to the dealers, who in turn had reimbursed the consumer up to 95 per cent. of the amount collected. The chairman of the commission attested to the return made by the operators, and figured three of the largest operators serving the Philadelphia district bear out the fact that close to 95 per cent. already had been returned to the dealers in that vicinity.

"The evidence heard by the Anthracite Commission," Mr. Gawthrop says, "indicates that more than 90 per cent. of the tax collected by operators and selling agents under the Roney act has been returned to the dealers. I have not discovered that the retailers added the tax to the selling price to consumers. The retail coal dealers seem to have absorbed this increase in price and stood the loss in profits. I have knowledge that some consumers who have bought from the operators and middlemen have had the tax refunded to them."

Parties in Conference Disagree

Capital and Labor clashed at the capitol on Nov. 21, during the opening sessions of the fourth annual industrial, welfare and efficiency conference. The discussion between the opposing forces centered about a proposal that the legislature pass a stringent law regarding trespassing on the rights-of-way of the railroads of Pennsylvania. Although the companies have desired this law for years, the labor unions have indorsed it only in part. The labor men say the law in respect to trespasing should be stringent, except as it applies to railroad employees, and that to make the statute general would permit the companies to arrest all railroad men at sight in case of strikes.

The proposed trespass law was brought before the conference by L. F. Loree, president of the Delaware & Hudson company, and was supported by many coal operators Roger Devers, counsel for the United Mine Workers, was one of the leaders of the opposition. After a spirited debate it was decided that it was within the province of the conference to make recommendations direct to the legislature, and the motion to refer the matter to the Public Service Commission was adopted.

Nine suggestions for amendments to the Workmen's Compensation Act were made at the session held on Nov. 22. These were:

1. That the compensation be 66⅔ per cent. instead of 50 per cent.
2. That the law be made compulsory and apply to foreign labor.
3. That the waiting period of 14 days be eliminated and compensation date from the day of the accident.
4. That the employer or the insurance carrier defray all expenses for treatment, artificial limbs and the like. The $25 allowed for medical and $75 for surgical aid is considered insufficient.
5. That compensation be allowed for disfigurement.
6. That dependents of aliens be paid the same as American workers
7. That compensation be based on the number of days of actual employment, and not 5½ days.

8. That the law apply to industrial diseases.
9. That employers insure with the State Insurance Fund.

These were the only amendments discussed during the period set aside for the consideration of the measure. The suggestions came from Francis Feehan, of Pittsburgh, a member of the commission that drafted the present act, and represented the coal-mining labor element of the state on the commission. He said he did not favor some of the provisions of the present law, but realized that the present law was better than nothing.

State officials advised that the law should be given a three years' trial before any amendments were made. It was suggested that no amendments be offered in the legislature until 1919.

David H. Fowler, representing the United Mine Workers, Scranton district, made a plea for larger compensation for miners who are virtually incapacitated, and gave instances of where families of miners who had been blinded and crippled received less than if the men had been killed. The care of such miners, he said, meant the constant attention of someone.

Patrick Gilday, chief of the Bureau of Mediation and Arbitration of the state, and formerly president of District No. 2 of the United Mine Workers in central Pennsylvania, discussed the elimination of labor disputes before the conference.

Mr. Gilday has been quite successful in settling strikes throughout the state, especially among bituminous miners, and declared that compulsory arbitration never will end labor disputes. "For quite a number of years," he said, "there have been various attempts to enact laws providing for compulsory arbitration of disputes. The effort has been to use the police power of the state to compel both employing corporations and their employees to continue their activities regardless of any differences they may have as to wages or conditions of labor. There are two fundamental troubles with this plan.

"In the first place, every man feels that his labor is his own property and none, not even the state, can force him to part with it, for that would be involuntary servitude, or slavery. Therefore, a law compelling a man to work, to every man who is not a criminal or a convict, would be extremely repugnant. The employer is in a position of commanding advantage. He hires the man and pays the wages; he also establishes the working conditions. He has the right to hire and discharge and can use that power to regulate and discriminate against any employees who are not amenable to any new regulations or working conditions he may wish to introduce. Compulsory arbitration, therefore, amounts to an effort to compel the worker to labor whether he wishes or not. It establishes involuntary servitude, prohibited by the 13th amendment to the United States Constitution. It limits and abridges the freedom of contract and is in violation of all principles of liberty, freedom and the pursuit of happiness. It is class legislation of the most vicious character. It cannot and will not eliminate strikes."

Mr. Gilday cited various instances in other states and Canada where compulsory arbitration laws have failed to end labor troubles.

He declared that there is no known method of tying the hands of labor except reasonable restrictions on both sides as may come from mutual agreement in which the principle of collective bargaining is recognized and expressed in a trade agreement between the employer on the one side and the employees upon the other, under the terms of which each respects the rights of the other and a method of settlement of all differences of opinion is provided. Under the collective bargain or trade agreement both sides mutually agree on some plan to adjust or to arbitrate any dispute that arises.

Mr. Gilday declared that in all industries where unions are not recognized a labor department, critical of everything touching the interests of the workers, should be established.

"When wage earners organize to strike and undertake to enforce their demands upon their employer without regard to his rights they may gain for a time, but they are sure to lose in the end. Likewise when the employer undertakes to handle the labor question by suppressing the rights of the workers and enforce rules arbitrary and aggressive in design, he, too, may suceed for a time, but he will fail in the end."

Can the Cave Evil Be Checked?

Governor Brumbaugh, who has on a number of occasions expressed his deep interest in the campaign for a solution of the mine-cave problem in Scranton, is seeking to arrange a conference between the presidents of the big coal roads and citizens of Scranton.

It is understood that the governor is about to go to New York to call on President W. H. Truesdale, of the Delaware, Lackawanna & Western Railroad Co., and other coal road presidents, to see if some solution of the cave evil may not be reached.

Last spring the governor, while a guest at the 8-hr. day celebration of the United Mine Workers, suggested that the best means of geting a solution of the cave problem would be a conference at which the parties at interest, the mine owners, the property owners, the city officials and the organizations that are fighting for a remedy could get their feet under a table and talk matters over calmly, each recognizing the rights of the other, but all recognizing the right of the people to safety for their lives and property.

The governor also asked the laboring men of Scranton to act in concert with Mayor Jermyn in the preliminary plans.

Mayor Jermyn at that time was in communication with the governor. A suit now in the Supreme Court will have a tendency to show the legal redress possible for cave damages, and the mayor asked the governor to try to hasten the publication of the opinion of the highest court on that suit. That was late in the spring. The court has not yet handed down its decision.

The governor's present plan, it is understood, would call together the coal presidents, representatives of the city government, the Surface Protective Association, the Central Labor Union, the Board of Trade and property owners whose homes have been damaged. At such a conference the matter could be discussed calmly and the governor has expressed the opinion that a calm consideration might bring about a solution.

The people of Scranton are of the opinion that conferences get you nowhere, but desire the governor to use his influence with the legislature to pass a bill regulating the mining of coal in the interest of surface support. It is believed that this will solve the question.

PENNSYLVANIA

Anthracite

Nanticoke—Water and slush are being pumped into No. 1 shaft of Susquehanna Coal Co. colliery No. 7 in an effort to extinguish a fire in an isolated section of the shaft. Company officials believe they have the fire under control and say it has not interfered with the operation of the main colliery openings.

Hazleton—A rumor prevails that the Lehigh Coal and Navigation Co. has formed plans to purchase or lease the abandoned coal workings at Silver Brook and Humboldt from the Lehigh Valley Coal Co. Both of these mines have been abandoned and flooded for over a decade. The Humboldt workings adjoin those of the Lehigh Coal and Navigation Co. at Harwood and some of the measurers have been worked by the latter company under lease from the Lehigh Valley since Apr. 1.

Minersville—The Pine Hill Coal Co., operating a colliery and washery near here, has just completed a series of improvements which will greatly enhance the output at that colliery. A new slope has been driven inside. A new plane in the Black Heath vein has been completed together with a slope which will connect the drift workings with the shaft. Proving in the White Ash vein has opened up another dip which will give mining for some years in that part of the workings. This company pays a bonus to its men who work steadily, and it is a noteworthy feature that this colliery is often able to operate when other places near by are closed down for lack of men.

On Saturday, Nov. 18, J. B. Neal, of the firm of Thorne, Neal & Co., owners of the Buck Run colliery, was chairman at the dedicatory exercises in connection with the opening of the new three-story private school building which he personally presented to his employees for the education of their children. Five teachers will be quartered in the building together with a resident nurse who will look after the health of the employees and their families and will instruct the first-aid teams as soon as the new hospital is completed. The new hospital and first-aid practice rooms will be on the top floor of a new bath house which the company is erecting at the colliery.

Branchdale—Otto colliery, one of the Philadelphia & Reading Coal and Iron Co.'s most important operations, is contending with a severe mine fire. The fire has been raging since Saturday, Nov. 18, and three men have been overcome by black damp, but all recovered. The fire is in a shaft 1,200 ft. below the surface.

Bituminous

Connellsville—Two men were killed and another was probably fatally injured on Nov. 23, when they plunged 100 ft. down an airshaft at the Juniata plant of the H. C. Frick Coke Co. A scaffold on which they were working in placing new timbers in the shaft collapsed.

The coke production of the region for the week ending Nov. 18 amounted to 398,299 tons of which the merchant ovens produced 151,380 tons and the furnace ovens 246,919 tons. This is a decrease from the former week of 9407 tons made by the merchant interests and 13,807 tons produced by the furnace interests.

Lambert—The safety pictures of the H. C. Frick Coke Co. are being shown to residents of the Klondike. These moving pictures clearly demonstrate the safety methods of the company. Three reels of industrial pictures are being shown and one comic reel.

Stoneboro—A force of men has been at work for some time at the abandoned No. 3 mine of the Mercer Iron and Coal Co. The water is being pumped out, and the slope and main entries cleaned up. The framework of the tipple has been reinforced and put in shape to handle the output. The old engines have been overhauled and pumping machinery has been installed. A new fan is being erected which when completed will enable the workmen to proceed with clearing away all fallen rock and débris. It is the intention to have the mine in operation by the middle of December.

Indiana—A tract of coal containing 800 to 1,000 acres, in Rayne Township, Indiana County, has been optioned at $50 per acre for six months by unknown parties. Tests will be made within 60 days.

Johnstown—A number of applicants have been received by Johnstown operators from mine rescue experts who want the position of superintendent of the safety station to be established here in the near future. The operators will meet within the next few days to consider these applications.

The Mecco Coal Co. put into service on Nov. 23 its new steel tipple, and it is expected that the improved facilities will result in the doubling of the output of the concern. The Mecco mines were recently purchased by J. Blair Kennerly and others.

WEST VIRGINIA

Charleston—Thirty-eight fatalities occurred in West Virginia during the month of October. Thirteen men lost their lives in Marion County, 10 fatalities being due to the explosion in the Jamison Mine at Barricksville, three each were lost in Brooke, Kanawha, and Marshall Counties, six in McDowell, four in Raleigh, two each in Fayette and Mercer, and one in Randolph and Putnam.

Princeton—The biggest day's loading of the Virginian Railroad Co. in its entire history was Monday, Nov. 20, when 540 cars were loaded as against 530 being the next highest record.

Fairmont—The fourth explosion, which was not nearly as destructive as the previous ones, occurred in the Jamison mine recently. This explosion was more in the nature of a puff and had been expected by mine officials. The only men near the mine exits were those engaged in sealing up the operation from the air. These escaped without injury and no damage was done by the blast other than the knocking down of temporary brattices. Contracts have been let for the drilling of two bore holes from Buffalo Creek into the mine workings. It is believed that these will allow enough water to enter the mine to drown out the fire which has been burning for the last month. It will be some months before the mine will be in position to resume operation.

Glen White—A new order has been issued by the E. E. White Coal Co. at Glen White and Stotesbury. Mine officials are instructed to discharge every man on the pay roll who drinks. The order was inspired by the danger of having intoxicated men at work in the mine. This order well illustrates the modern tendency to retain only sober men in industry.

Bluefield—During the month of October the Norfolk & Western R.R. shipped 2,910,077 tons of bituminous products. This compares with 3,027,236 tons carried during the corresponding month of last year. The shipments for the previous month were 2,982,919 tons. Last month's shipments brought the total for the 10 months of the year up to 28,700,603 tons or 994,791 tons short of the 29,695,394 tons carried during the entire 12 months of 1915.

Greenville—The Valco Coal Co., A. P. Sharp, of Huntington, general manager, has begun driving entries on its property on Little Coal River in the Alma Seam. Temporary use will be made of a lumber mill siding, and coal recovered in entry-driving will be hauled to this point and shipped. The mine will be equipped to produce 500 tons per day.

KENTUCKY

Whitesburg—Since the investigation into the car shortage situation was started by the Interstate Commerce Commission in Louisville some time ago and the embargo was lifted on coal cars of the Louisville & Nashville going further north than Louisville or Cincinnati considerable improvement is noted and coal is moving with greater rapidity than at any time within the past twelve months. Operators are now receiving about all the cars they can load and mines are running full time. Night shifts are being added in most of the mines in the Elkhorn field. Hundreds of new miners have been added within the past few days.

The Consolidation Coal Co. is planning extensive reforestation work on its large properties in eastern Kentucky, it is understood. The Kentucky Forestry Department will aid in the work by supplying trees.

Hazard—The coal mining plants around Hazard are now operating both day and night shifts and every mine is running to full capacity. Another record-breaking run for a single day was made recently when 178 regular gondolas were loaded and shipped from the Hazard yards. Business was never better in this field.

OHIO

Gallipolis—Not since the Civil War has there been so much activity in the coal industry of this section as at the present time. In Meigs County as well as in Gallia County, every acre of coal land is to be developed at once. It is said that Pittsburgh capitalists will take over the Willard coal lands near Racine, which comprise more than 8,000 acres. This syndicate proposes building a $250,000 plant, and the Hocking Valley R.R. will extend its lines from Pomeroy Bend to the new development. The coal will be shipped by Lake to the Northwest.

Bannock—The Pauline Mine of the Progress Coal Co. has resumed operations after an enforced

idleness of several weeks. This company has signed a contract to furnish coal to the Erie R.R., this being the same contract it had before the beginning of the strike. A sufficient number of cars has been secured for the shipments and the mines will work full time as soon as men can be obtained.

INDIANA

Terre Haute—Arrangements are being made at the Gregory mine, rented by Mayor Gossum, to supply residents of Terre Haute with coal. The price at present asked is $2.75 per ton. An increase in the output of 100 per cent. was recently made. In order to meet the demand the mayor is trying to lease other mines, but so far has been unsuccessful. He will ask the common council at a meeting shortly for an appropriation to establish a municipal coal yard.

ILLINOIS

Kincaid—More than 100 families of coal miners have abandoned their homes here and at Tovey to take jobs offered them at Pawnee, where the Peabody Coal Co. recently reopened its mines. The mines here have been closed for eight months and there is no immediate prospect of reopening.

Herrin—For the first 21 working days in November the Peabody No. 3 mine led all of the Williamson County mines with a production of 44,534 tons. The Chicago & Carterville Coal Co. came next with 55,097 tons from its two mines. Considering the car supply this is considered a good output. The tonnage for the county for the same period will be about 427,000 tons.

Sparta—The Eden mine of the Willis Coal and Mining Co., of St. Louis, has reopened here. This puts the three mines of that company producing, but nearly all of their tonnage is being taken by the M. & O. R.R. for company use. Cars for open-market business on the M. & O. would run a mine about a day and a half each week, and the restrictions keep them from going to foreign lines.

Belleville—Edward Dobbins, a member of the Illinois United Mine Workers' executive committee, is organizing a medical benefit association among the miners to combat announced increases of fees by the Belleville doctors. It is intended to employ physicians by the year to treat members of the association. The plan has been carried out successfully in other industrial centers.

Johnston City—George L. Gahm, cashier of the state bank, has closed a deal for 800 acres of coal lands a few miles east of this city. He has not stated for whom he is acting but it is understood that the lands will be turned over to one of the big companies that is extending its holdings in this field.

Danville—Robert Pettigrew, mine inspector for Vermillion County, in his annual report, states that a total of 2,621,756 tons of coal have been mined during the past year. Among the 3,100 employees there were 11 fatal accidents and 60 non-fatal accidents. There are 25 mines in the county. During the year nearly all of the companies have built wash- or change-houses for the men. The most important resumption during the year was Producers No. 24, owned by the Peabody Coal Co., which had been shut down for two years. The company, he reports, spent $100,000 in improvements, installation of six mining machines, a 20,000-gal. water tank, concreting and putting steel beams on main entries.

Personals

Arthur V. Farr, who for the last three years has been advertising manager of the SKF Ball Bearing Co., Hartford, Conn., has accepted the position of sales manager of the Hess Steel Corporation, of Baltimore, Md.

George A. Burrell was tendered a testimonial banquet and presented with a gold watch recently by his colleagues upon the occasion of his resignation from the Bureau of Mines. Mr. Burrell has entered into consulting work and is also president of the Natural Gas Products Co. of Pittsburgh, Penn.

Obituary

Franklin Morey, aged 85 years, died recently at the home of his father-in-law, Clarence H. Howard, in St. Louis, after an illness of one week. He was well known years ago to the mining fraternity, being one of the best known of mining engineers when the West was in the infancy of its development. He had been in retirement several years. Mr. Morey was born in Rome, N. Y. and went to Denver in 1886. He came to St. Louis just before the Civil War and organized a reserve company there.

George L. Sands, age 71 years, general manager of the Missouri & Northern Arkansas R.R. and former general manager of the Wiggens Ferry Co. and president of the New Staunton Coal Co., of St. Louis, died at his home in St. Louis, Nov. 21, after an illness of several years. He was born in Brunswick, Maine, Apr. 18, 1845, and served throughout the Civil War in the Navy as an ensign. He began his railroad career as a brakeman on the Chicago & Northwestern in 1865 and rose to division superintendent and was later vice-president and general manager of the St. Louis, Kansas & Colorado R.R. He was active in developing the central Illinois coal field and the New Staunton Coal Co.'s property, which is one of the biggest producers in the state.

Industrial News

Los Angeles, Calif.—The Lidgerwood Manufacturing Co., New York, has opened a branch office in the Hibernian Building, Los Angeles, Calif. Charles A. Baechtold will be in charge of this office.

Columbus, Ohio—The General Electric Co. recently filed with the State Utilities Commission a claim for $3,752.31 for overcharges on coal hauled to its Fostoria plant from Nelsonville by the Hocking Valley Railway Co.

St. Louis, Mo.—The property and mines of the Great Western Coal and Coke Co., at Wilburton, Okla., were sold at a receiver's sale recently to C. H. Kimball, of this place, and James Duncan, of Alton, Ill., bondholders. The price, it was announced, was $25,000.

Connellsville, Penn.—The H. C. Frick Coke Co. is building five cottages at Trotter and 10 at Leisenring, No. 1. All are of the bungalow type, containing three rooms. There is at present considerable activity in the building line at this company's plants. The Connellsville Construction Co. is putting up two large barns at the Kyle works near Fairchance.

Huntington, W. Va.—At the recent meeting of the Ohio Valley Improvement Association, the state of the coal market and the car supply were cited as reasons why work to establish a permanent nine-foot stage on the Ohio River should be pushed vigorously. Such a stage would enable coal to move the year around, and would stimulate its forwarding by river, it was asserted.

Cincinnati, Ohio—The Fleischmann Co., a large manufacturer, has purchased 40 wooden coal cars for the purpose of facilitating the forwarding of its own coal supply from West Virginia mines. The cars were secured at a moderate price, it is said, and the company believes they will justify the investment by making it possible to get coal regularly and without reference to the outside supply of cars.

Philippi, W. Va.—The West Virginia coal land property of J. M. Guffy and the West Virginia Co. consisting of 27,000 acres of coal, principally in Barbour County, were sold recently to H. G. Cooper, of Pittsburgh, for $480,000. The sale was made under a decree issued by Judge John C. Rose, of Maryland, in the United States Court, as a result of action instituted by the bond holders and unsecured creditors of the company.

Marion, Ill.—This city, the county seat of the greatest coal-producing county in Illinois, is threatened with a coal famine. With coal mines within a few miles on all sides the operators find the home market too low in price to consider. The local Trades Council has issued a letter to other labor and mining organizations in this district, asking coöperation in placing the matter before the Illinois Public Utility Commission.

Pottsville, Penn.—Paul W. Houck, State Compensation Referee, on Nov. 21, was confronted by a peculiar problem. Mrs. Lucinda Yeager is claiming the usual compensation from the Thomas Colliery Co. for the death of her husband. He was killed while loading a car on the Lehigh Valley R.R., and the widow was paid $4,600 by the railroad company, although her husband was employed by the coal company. The question now is, can a widow receive damages and also be entitled to compensation.

Norristown, Penn.—Francis Y. Eavenson, owner of much property and also of part of an island in the Schuylkill River at this point, has brought two suits against the Maryd Coal Co. and the Darkwater Coal Co., each for $10,000. He alleges that culm and muck from the mines of the two companies near the headwaters of the Schuylkill are permitted to find their way into the river and do great damage to his growing crops and to his pastures and makes the water unfit for the use of his cattle, causing him great loss.

Philadelphia, Penn.—The majority of its stockholders having passed a resolution to dissolve, the Mason Coal Co., on Nov. 24, presented a petition in Common Pleas Court No. 2, asking for a decree of dissolution. The company, which was incorporated in November, 1903, explains in its petition that it owes no debts and has no liabilities. The company operated throughout the State of Pennsylvania and had its principal office in this city. It is not disclosed in the petition why the stockholders decided to dissolve the company.

Pittsburgh, Penn.—A coal storage pit of 100,000 tons capacity is being dug on Brunots Island by the Duquesne Light Co. It is said that this will be the largest in the world, being 25 ft. deep, 800 ft. long and 154 ft. wide. The bottom is being laid in concrete 16 in. thick. The sides of the pit will slope outward and will be made of concrete slabs. Several feet below the top a pipe will enter through which water will be pumped into the bin from the power plant of the company. The bottom of the pit is on a level with the river at pool stage.

St. Louis, Mo.—Car-supply conditions in this territory are the best that has existed since last summer. Mines on the Illinois Central and C. & E. I. jointly worked five days out of six. The Iron Mountain gave two days' supply; the M. & O. less than two and on the other lines in the Inner Group there was a slight improvement. The C. B. & Q. has the most equipment of any coal-carrying road in southern Illinois. In the central Illinois field the C. & N. W. and Milwaukee lines give their mines almost full working time.

Cincinnati, Ohio—Another suit growing out of the difficulty to secure coal was recently filed in Common Pleas Court. In this action the Producers' Coal Co. is demanding $100,000 damages from the Mifflin Coal Mining Co., a West Virginia corporation, alleging that on Nov. 1 last it repudiated a contract, made Apr. 26 last, to sell the entire output of a mine to the Producers' company at $1 per ton, at the mines. It is alleged that the Producers' company has been damaged to the extent of $100,000, as it will have to go into the open market to fill its contracts.

Fairmont, W. Va.—The chemical department of the Consolidation Coal Co. will soon be ready to move into the new laboratory which is being constructed. This building is of brick and fireproof. It will be two stories high with a basement, the dimensions being 35x56 ft. It will contain the offices and a library. The latest and best apparatus and appliances will be installed, so that the chemical force may carry out experiments and tests. The materials used by the company as well as the gases and coal found in the mines will be analyzed. The present chemical laboratory has become inadequate.

Pottsville, Penn.—Because of complications which have arisen in the election of four mine inspectors in Schuylkill County, quo warranto proceedings are to be started immediately by counsel for Mine Inspector Keran Donahue, who was one of the Democratic nominees for inspectors this year and who was defeated by Evan Evans. If the court sustains the proceedings the election of M. J. Brennan, of Pottsville; A. B. Lamb, of Shenandoah; P. C. Fenton, of Mahanoy City, and Evan Evans, of Coaldale, will be declared illegal. It is alleged that the names of all of these officials were placed on the ballots at the primaries last spring illegally.

Charleston, W. Va.—Ore cars from the mining regions of the Northwest may help to solve the car shortage in the mining regions of West Virginia, Ohio and Indiana. The use of such cars has been tendered by the Minneapolis, St. Paul and Ste. Marie R.R., under guarantee that they will be returned to the owning road in 1917. There are 200,000 such cars available and the operators of West Virginia have been given assurances that arrangements will be made shortly by the Interstate Commerce Commission so that they may be brought East, as their season of usefulness to the ore-carrying roads will have ended with the closing of the Lake trade soon.

Cincinnati, Ohio—A hearing was held by a special agent of the Department of Justice a few days ago, in which evidence was taken on the coal situation. The testimony heard from coal operators and dealers was to the effect that a heavy demand, coupled with a car shortage and labor scarcity, is responsible for the high prices, although Cincinnati is better off than most cities, on account of having several near-by sources of supply. The labor factor is now perhaps the most serious, some operators declared, on account of the loss of men caused by the limited operations brought about by the poor car supply, and the high wages paid for labor in other industries. The investigation was continued.

Pittsburgh, Penn.—Announcement has been made by the Westinghouse Electric and Manufacturing Co. of an extension of its present bonus system to include salaried and office employees on hourly rates, by which they will receive a bonus of 8 per cent. of their salaries each month providing their total excusable time absent and late during the month does not exceed 6 hr. incurred on not over three occasions. An additional 4 per cent. will be given each month to the employee who has not lost any time from work during the month through absence or tardiness, thus enabling those affected to obtain an increase in earnings of 12 per cent. for a 100 per cent. attendance. Several thousand employees in the Pittsburgh district are benefited by the granting of the bonus.

Springfield, Ill.—The Illinois Public Utilities Commission held a three days' hearing at the State House recently in an attempt to reach a solution of the car-shortage question. A large number of railroad men and shippers testified. The hearing adjourned to Dec. 11 at Chicago, where the question of increased demurrage rates published by several roads, and the reconsignment of cars will be taken up. C. B. Carty, of Chicago, attorney for the Chicago & Eastern Illinois Railroad Co., told the commission that the coal-car shortage was caused by the failure of railroads to abide by the rules of the American Railways' Association governing the use of coal cars. Other railroad representatives said they believed that the shortage would be relieved by the amending of the rules of the association governing the charge for and interchange of cars.

Market Department

GENERAL REVIEW

Anthracite market quiet but well maintained. Bituminous generally strong but nervous and uneven. Cessation of Lake shipments fails to help the Pittsburgh district. Very urgent demand continues in the Middle West.

Anthracite—The relatively mild weather is counterbalancing the effect of the very abnormal demand in a most gratifying manner. In spite of the inadequate transportation facilities, shortage of labor and consequent limited production, the market is just about holding its own. There are now even occasional small offerings of free coal in the market, and there are very definite rumors of more to be offered during the current month, provided weather conditions continue favorable. The situation is notably more quiet, with a well-defined tendency to ease up, but with no significant weaknes as yet. Big operators have almost unlimited orders still on their books, but there is an absence of the very urgent demand that characterized the inception of the boom. The interval of mild weather has enabled dealers to get their customers fairly well supplied and placed them in a substantially better position to meet the next big rush for coal. The month just closed was probably the most active and profitable November in the history of the anthracite trade; sales were big and top prices ruled in every instance.

Bituminous—The market has fluctuated unevenly several times in the course of the past week; the situation is also spotty, advancing and declining at various points according as railroad embargoes are placed and taken off against certain districts. The general tone is very strong and the market shows every indication of gradually adjusting itself to a continuation of existing high prices. It is noted, for instance, that some of the very strongest companies are quietly feeling out their customers on the matter of new contracts, and it is understood that while the figures mentioned on this business are, of course, substantially below the ruling prices in the spot market, at the same time they show a handsome increase over the old contract figures. The visible supply at Tidewater is constantly decreasing, and export cargoes are being made up with difficulty. Car and labor supply, together with weather conditions, are the dominating factors in the market on which everything will hinge from now on.

Lake Trade—The windup of the Lake shipping season finds the situation very mixed. Expectations of relief from existing high prices were apparently so generally anticipated that surplus stocks were allowed to dwindle away, and the net result appears to be an even more severe shortage. In addition to this the embargoes placed in the Pittsburgh district have not brought any relief in the car situation, nor has the cessation of shipments to the Lake ports apparently increased the supply. On the other hand, the lifting of embargoes by some of the Southern roads against shipments to the North has had a tendency to relieve the high tension in the latter market, though at the sacrifice of a further tightening in the Southern situation. Dealers continue staying out of the market because of the ruling high prices, so that stocks are low, and any serious interruption to transportation would occasion a very heavy rush for coal. A falling off in the gas supply at a number of industrial centers has thrown an additional demand on the coal market. Tentative negotiations on new contracts indicate substantially higher prices.

Middle West—There has been no slowing up in the Middle Western markets; in fact, the situation is getting steadily tighter, and the top is not yet in sight. An interesting development is the appearance of considerable free tonnage from small mines to take advantage of the abnormal price level for spot coal, and one of the results has been a further restriction in the labor and car supply to other companies making shipments on regular contracts. The difficulties of the situation are being accentuated by purchases of heavy surplus tonnages by railroads and public-service corporations in anticipation of a possible suspension of the country's transportation facilities. The outside demand from all directions continues unabated, particularly from the Northwest, where it is clear that the Lake shipments are going to fall very substantially behind requirements. At St. Louis there has been public demonstrations protesting against the high cost of coal, which is a very significant indication of the ruling situation. On the whole, the market is fluctuating over a wide range and subject to a violent advance on the slightest pretense.

A Year Ago—Anthracite trade uncertain and hinging on weather conditions. Railroad embargoes force bituminous buyers to cover. Exports at a standstill. Closing of Lake navigation finds the market strong. Cold snap causes an urgent demand in the Middle West.

Comparative Average Coal Prices

The following table gives the range of mine prices in car lots per gross ton (except where otherwise noted) on 13 representative bituminous coals over the past several weeks and the average price of the whole group for each week:

Boston	Last Year	Dec. 2	Nov. 25	Nov. 18	Nov. 11	Nov. 4
Clearfields	$1.25@1.75	$4.75@5.75	$4.75@6.00	$3.65@3.45	$3.50@4.25	$3.10@3.85
Cambrias and Somersets	1.35@1.80	5.25@6.25	5.25@6.50	4.00@5.25	3.75@4.75	3.50@4.10
Pocah. and New River[1]	3.75@3.90	9.00@10.00	9.00@10.00	8.50@9.50	8.50@9.00	6.25@7.25
Philadelphia						
Georges Creek	1.85@2.00	6.00@6.50	6.50@7.00	7.00@7.25	7.00@7.25	4.75@5.00
W. Va. Freeport	1.35@1.40	5.00@5.25	5.00@5.50	6.25@6.50	6.25@6.50	4.25@4.40
Fairmont Gas mine-run	1.20@1.25	5.25@5.50	4.75@5.00	6.45@6.55	6.45@6.50	5.00@5.25
Pittsburgh[2]						
Mine-run	1.15@1.20	4.25@4.50	4.75@5.00	4.75@5.25	5.00@6.00	4.50@5.50
¾-in.	1.25@1.35	4.25@4.50	4.75@5.00	4.75@5.25	5.00@6.00	4.50@5.50
1¼-in.	1.35@1.45	4.25@4.50	4.75@5.00	4.75@5.25	5.00@6.00	4.50@5.50
Slack	.90@1.00	4.25@4.50	4.50@4.75	3.75@4.25	4.50@5.50	4.00@4.50
Chicago (Williamson and Franklin Co.)[2]						
Lump	1.65@1.75	3.50@4.00	3.50@4.50	3.50@4.00	3.00@4.50	3.00@3.25
Mine-run	1.10@1.20	3.50@4.00	3.50@4.00	3.25@3.75	2.50@2.75	2.00@2.75
Screenings	.65@.75	3.50@3.75	3.25@3.75	3.00@3.50	2.25@3.00	2.00@2.50
Gross average	$1.45@1.60	$4.80@5.31	$4.94@5.45	$4.90@5.35	$4.82@5.54	$3.95@4.56

[1] On cars Boston and Providence. [2] Per net ton.

BUSINESS OPINIONS

Boston News Bureau—The situation really changes little day by day. Rumors are perhaps more plentiful as is normal when influences are at work to check speculation and force liquidation. Money is firmer because bank reserves are down to a point that makes some bankers more or less uneasy. But higher money in New York is resulting in further gold imports. The action of the Federal Reserve Board in warning banks not to invest in short-time foreign treasury bills with renewal privileges is causing some bad blood in banking circles. The board holds that idle money is needed for domestic purposes. Little fear, however, is felt that any real danger exists in the money position. It is best belief that this will shortly correct itself by speculative liquidation and the inflow of gold. The fact is, sentiment at the moment is more two-sided.

Dun—Inability to meet requirements is becoming more pronounced and general, and an increasing number of sellers endeavor to repress demand in an effort to control prices. Yet the upward movement in many lines is unchecked as buyers, finding supplies scarce and fearing a greater shortage next year, are competing more actively in the markets for raw materials and finished products. In all leading branches the rush to cover forward needs continues, and steel and iron, textiles, hides and leather and footwear have gone still higher, with no sign even now that the crest has been reached. Commercial failures this week in the United States are 313, against 283 last week, 285 the preceding week and 345 the corresponding week last year.

Bradstreet—Trade, in company with industrial operations, moves along at a record clip, with products of the mine, field and factory virtually selling themselves, whether it be steel or iron, provisions, dry goods or furniture. On the other hand, speculative markets—stock, grain and cotton—tend to lag, presumably because of calls for larger margins or concern about possible international political complications, while retail trade in winter goods is held in check by mild weather. Buying of manufactured products, instead of being stayed by higher prices, seems to have become frenzied because of fears of further advances, because of concern about future available supplies and because it is recognized that unparalleled consumption overtaxes production.

Dry Goods Economist—Advances in wages made by mills and finishing works in a number of centers point to still higher prices in the near future. This applies both to cottons and to woolens and worsteds. Important changes on staple cottons were made this week. In addition to the higher cost of labor, further augmentation in the cost of raw cotton is indicated, although the upward movement will doubtless be marked by occasional recessions, as was the case this week. The decline, however, left the price of spot cotton well above 20c.

Marshall Field & Co.—Wholesale shipments of dry goods for the current week have been in excess of the corresponding period of a year ago. Road orders for both immediate and future delivery are running in larger volume than for the same week of 1915. Customers have visited the market in larger numbers. Collections show an increase over the same period last year. Prices are firm.

Atlantic Seaboard

BOSTON

Market inactive, but no modification in price. Hampton Roads coals preserve an equilibrium at prices last quoted. Georges Creek unchanged, and the Pennsylvania grades more or less erratic. Anthracite dealers anxious.

Bituminous—While there is no evidence of any marked recession in price, the market is dull and sales are only scattering. Another spell of mild weather reminds the trade how sensitive high prices are to every influence. A blocking snowstorm would almost certainly send them soaring again. It is actually hard to determine what current prices are. The shipper with coal in transit that he must sell gladly accepts a dollar less than some consumer who is eager to replenish his stock is willing to pay; in other words, it depends upon whether one is buying or selling.

At Hampton Roads spot sales are less and less frequent. Car supply is still the important factor, and the agencies are so anxious over protecting their contracts that they are still confining themselves for the most part to old obligations, both offshore and coastwise, and clearing the boats in as short time as possible. The arrival here on Nov. 21 of the steam collier "Newton" with 6,780 tons of Clinchfield coal from Charleston, S. C., is an interesting sidelight on car supply in West Virginia. It is reported the cars could not be arranged for on the roads running to Norfolk and hence the coal had to be sent to Charleston. The recent opening of several new operations in West Virginia is held responsible for part of the car shortage.

Cargoes of Pocahontas and New River coming forward are being insured at very high valuations but apparently there is very little being offered in the open market. Nor is there any volume of coal to be had on cars at Boston, Providenec or Portland. Distributors are still able to keep their customers in supply moderately well. Quotations are unchanged, with only a scattering demand.

The Georges Creek situation discloses nothing new so far as current supplies are concerned. This grade is now practically unheard of f.o.b. the loading piers. Some of the operating companies have enforced a clause in their contracts with regard to advances in miners' wages, in one case 15c. per ton having been assessed, effective Oct. 15.

Although on high levels the market for Pennsylvania coals continues erratic and hard to analyze. Prices fluctuate with an ease that is baffling. As usual, a lot of small operations are again in commission, thriving on a "squeeze" market and paying the wages necessary to get miners, while the mines regularly at work, trying to keep up with contract obligations based on a much lower price, are hard put to it to keep what men they have. A better movement is expected when the car situation straightens out somewhat, but many of the producing interests are not optimistic. There is still a wide range of prices.

All-rail movement is more or less fitful into New England. Mines that are down to 30 per cent. normal output are unable to do much for this market with all the restrictions that apply to cars.

Coastwise cargoes with water rates at current figures are now so close to $10 that consumers will not purchase on that basis until absolutely obliged to.

Bituminous at wholesale is quoted about as follows, f.o.b. loading ports at points designated, per gross ton:

	Clear-fields	Camb. & Som's't	Geo'gs. Creek*
Philad'la	$6.00@7.25	$6.50@7.50	.....
New York	6.25@7.40	6.75@7.75	.....
Baltimore	.....	.....	.....
F.o.b. mines	4.75@5.75	5.25@6.25	.....

*On contract.

Pocahontas and New River are quoted at $7@7.50 f.o.b. Norfolk and Newport News, Va., for spot coal, and $9@10 on cars, Boston and Providence, for inland delivery.

Anthracite—An opinion that the State of Maine trade now has enough to carry through the winter is hardly borne out by the facts. The Eastern dealer who has drawn from his usual source of supply 75 per cent. of what he was able to get during 1915 is the exception. A careful canvas would not show any such rosy situation, for to the points now soon to close to navigation a constant supply will have to be railed from the nearest rehandling plants if the dealers are to keep ahead of actual needs.

The general situation is worse rather than better. Barges are slower loading at all the ports and some of the leading companies are at a standstill so far as Tidewater coal is concerned. Large storage piles of chestnut and pea have been worked off, and in more than a few cases boats are held against daily receipts. These receipts are very light, and it is hard to account for the lack of anxiety on the part of the general public that seems to prevail just now. Some cases of heavy demurrage are reported from the New York loading ports, where bottoms have been waiting upward of a fortnight.

PHILADELPHIA

Anthracite helped by mild weather, but heavy demand continues. Little premium coal offered. Stove leads in demand. Good pea shipments, with circular price at old figure. Bituminous prices unsteady. Railroad embargo removed.

Anthracite—Notwithstanding all the adverse conditions of abnormal demand, poor car supply and small production the mild weather has alone prevented a panic in the local market.

Now that new business with the retailers has fallen off, the shippers obviously came through the month in better shape than they had a right to expect. It is doubtful if the stocks of prepared sizes in the numerous yards have been so low since 1902. The shipments of egg, stove and chestnut have not increased and it is reasonable to expect cold weather soon, which will cause a repetition of the earlier weeks of November.

Several individual shippers have intimated they may have more coal to offer at circular rates during December. If this proves true, the coal will naturally come to their neglected trade in Philadelphia and greatly relieve the burden on the big companies. The fact that the smaller shippers are beginning to offer coal here in increasing quantity would seem to indicate that the high price markets have been nearly satisfied, at least for the time being.

The large operators have an abundance of business on their books, but are not being quite so hard pressed for shipments.

The retail dealers having made much headway of late in their deliveries are making every effort to fill their bins so as to be prepared for the next rush. It has been a remarkable month, for although the weather has been unfavorable to big sales, there was a market at top prices for every available car of coal regardless of kind or size.

Of the sizes broken is still out of the market; the production is small and the operators are not at all desirous of increasing it. The full circular price of $3.65 for this size would be readily paid for every car shipped, but, with rare exception all that is mined is being applied on contracts taken last May at $3.50.

On egg the demand remains light as compared with the other prepared sizes, but it is scarce and shipments are long delayed. There seems to be no falling off in the requisitions coming in from other markets, but the demand for this size could probably be easily supplied if it were not for the large quantities taken by the manufacturing concerns who are using egg in place of broken.

Stove is as short as early in the month. No yard seems to be able to secure a stock of more than a few cars and most of them less than that. Although the demand is so great and the supply short there are practically no premium prices being offered here, as the Philadelphia dealer has never been educated to pay more than circular rates.

In several instances, however, retail dealers state they are able to secure a few cars of the scarcer sizes mined by some of the large companies and sold through a commission house at prices ranging from 30c. above circular on pea to 50c. on stove. No shipper wants it generally known that his coal is being sold in excess of the market price, so that whenever premium coal is offered in any market it is rarely sold direct by the company mining it.

Chestnut is active and some yards are short with occasionally a dealer who actually needs this size more urgently than stove. The heavy shipments from the storage yards, however, have saved the situation on this size. It is known that one company has entirely exhausted this source of supply.

Pea is fairly easy because an immense tonnage reached here during the past two weeks, including much storage coal. No representative dealer is short of it, and while all have heavy orders still in effect with the shippers, two more weeks like the last will bring requests to hold. The circular price on pea has dropped back to the old rate of $2.80 at the mines; for some reason one of the big companies which had accepted considerable business at $3 has reconsidered its determination to advance the price on this size.

The strong demand for all steam sizes continues without abatement, with the lowest grade, culm, bringing as much as 75c. a ton in many instances. Due to the high prices still prevailing for bituminous coal users of the latter are making all sorts of experiments by endeavoring to utilize the finer sizes of anthracite.

The prices per gross ton, f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for Tide, are as follows:

	Line	Tide		Line	Tide
Broken	$3.60	$4.75	Buck	$2.00	$2.90
Egg	4.15	5.25	Rice	1.25	2.15
Stove	4.10	5.60	Boiler	1.10	2.00
Nut	4.50	5.55	Barley	1.00	1.90
Pea	2.80	3.70			

Bituminous—There has been and continues to be considerable unsteadiness in prices. In the fore part of the week just as it was thought the market was gaining the momentum necessary to reach the former top figures, there was a sagging and almost all grades recorded sharp losses. Lately, however, there has been a recovery, but more particularly in the gas coals, which have now passed last week's figures. The other coals in general demand here while they have regained a portion of their decline have not as yet reached the highest marks of last week.

This latest strengthening in prices has been due to the complete removal of the railroad embargo which had been in effect for the last two weeks. When the roads announced they were ready to receive shipments the city was bare of coal and it was quite a few days before new consignments began to reach here in any considerable volume, as a result of which prices began to move upward.

While the market continues extremely active, it seems to be settling down to a routine, and once more the brokerage houses are able to secure some coal. There is also a tendency among the larger and stronger shippers to consider the question of long-term contracts at a reasonable figure compared with present market quotations.

Many operators with mines in the western part of the state have had their production much curtailed by local strikes and wage increases are becoming quite general. In the city the majority of the industrial plants have but a few weeks' supply at the most and are almost wholly dependent on what free coal comes on the market.

The prices per gross ton at mines at this time are quite well represented by the following list:

Georges Creek Big Vein	$6.00@6.50
South Fork Miller Vein	6.00@6.25
Clearfield (ordinary)	5.50@5.75
Somerset (ordinary)	5.50@5.75
West Va. Freeport	5.00@5.25
Fairmont gas, lump	5.50@5.75
Fairmont gas, mine-run	5.25@5.50
Fairmont gas, slack	4.75@5.00
Fairmont lump, ordinary	5.25@5.50
Fairmont mine-run	5.00@5.25
Fairmont slack	4.75@5.00

NEW YORK

Demand for anthracite continues strong. Pea in good demand, and buckwheat coals are gaining strength. Bituminous labor situation unimproved, car supply worse and higher prices predicted. Some grades out of the market.

Anthracite—The anthracite market is quiet but strong. Demand while good has not been active. Prices continue high, but dealers are not buying heavily. The situation depends considerably upon weather conditions, and every day brings a change in quotations. The mine workers continue their button strikes and production is being constantly curtailed. Supplies at Tidewater are short.

New embargoes interfere with shipments. Should the threatened strike of Canadian miners take place it would furnish an additional outlet for American coal. Another week will see the end of Lake shipments, although some vessels may continue in service until forced to stop.

Of the domestic coals chestnut is the longest, and straight cargoes are quoted at from 25 to 50c. below stove and egg, but for mixed cargoes the same prices are named for all three sizes. Quotations at the mine for line shipments range from $6.25 to $6.75. Demand for pea coal has sagged some, but the call is good and the better grades are practically out of the market. Line demand is heavy and quotations range from $4.25 to $4.75.

The buckwheat coals are easy, but a cold spell would soon drain the loading docks.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$4.95	.....
Egg	5.45	$8.50@9.25
Stove	5.70	8.50@9.25
Nut	5.75	8.00@9.25
Pea	4.00	5.75@6.00
Buck	2.75	4.35@4.75
Rice	2.20	3.00@3.25
Barley	1.95	2.10@2.25
Boiler	2.20	.....

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

Bituminous—The slump in the bituminous market of a week ago has been practically forgotten and prices are again stiff, though not as high as a few weeks ago. The labor situation is not as good, car supply is worse and still higher prices are predicted. The mining fields are honeycombed with labor disturbances and a number of mines are idle from day to day. The mine workers continue to be dissatisfied with the present wage scale in view of the increases given workers in other industries. Local strikes in Indiana County are not meeting with the approval of the labor leaders and the miners have been ordered to keep at work and to live up to their agreement.

The car supply has not improved. Operations along certain branches of the Pennsylvania and Baltimore & Ohio received about 30 per cent. of their requirements last month. One day last week the operations along one branch received no cars and on the previous day they received but 6 per cent. of their quota.

Local shippers continue to be pushed for deliveries to New England and Long Island points. While nearly everyone has some free coal on hand an order for a few thousand tons would clean up the available supply and cause quotations to take a sudden jump. There is not much free coal at Tidewater. Contract coals are moving in fair quantity, but no one is getting his full requirements.

Some grades are entirely out of the market and gas coal is scarce.

Current quotations, per gross ton, f.o.b. Tidewater, for various grades are as follows:

	South Amboy	Port Reading	Mine Price
Georg's Crk. Big Vein	$6.50@7.00	$6.75@7.50	$5.75@6.00
Tyson	6.50@6.75	6.50@6.75	5.50@5.75
Clearfield	6.25@6.75	6.25@6.75	5.25@5.50
South Frk	6.50@6.75	6.50@6.75	5.25@5.50
Nanty Glo	6.50@6.75	6.50@6.75	5.25@5.50
Som'r. Co.	6.50@6.75	6.50@6.75	5.25@5.50
Que'ho'ing	6.50@6.75	6.50@6.75	5.25@5.50
W. V. Fa'rm't Th'r'qua	6.50@6.75	6.50@6.75	4.75@4.90
Mine-run	6.35@6.50	6.35@6.50	4.50@4.75
West. Md.	6.25@6.50	6.25@6.50	5.00@5.25

BALTIMORE

Car supply again very light and market remains stiff. Little free coal at tide and demand active. Cold weather boosts hard coal demand.

Bituminous—With an uncertain car supply that seldom runs in excess of 60 per cent. and at times last week dropped to 20 per cent. in the Fairmont and Somerset regions, the soft coal trade has been selling over a wide margin. As a whole the market is stiffer than it was at this time last week, and prices as a general thing higher. Six-dollar coal at the mines to the trade has not been unusual where the fuel is wanted quickly. At tide the visible supply has been pretty well cleared up, and trouble has been experienced in getting enough coal to round up some of the recent export charters.

An order of the Interstate Commerce Commission that all open-top freight cars, whether loaded or unloaded, must be returned at once to owning railroads, is being regarded with interest. It is figured that this move, if enforced, will shortly bring relief to Eastern Railroads.

Prices to the trade at the mines are about as follows: Georges Creek, Tyson, $6.25; Somerset, $5.50; South Fork, $5.50@6; Clearfield, $5.50@6; Quemahoning, $5.50@6; Latrobe, $5; Freeport, $5; Fairmont gas, ¾, $4.75; mine-run, $4.75; slack, $4.75@5.

Anthracite—Hard-coal men are having their troubles in the face of a heavy demand for domestic fuels and the light rail deliveries. Yard supplies have been generally cleaned up of the more needed sizes such as furnace and stove coals. No. 3 hard and No. 3 Sunbury are particularly scarce. That premiums of from 25 to 50c. a ton have been paid recently by some coal men here to get prompt deliveries on their most urgent business is freely admitted.

Exports—Exports again declined mainly because coal cannot be obtained. The total loading for the week was 10,870 tons.

HAMPTON ROADS

No improvement in car supply. Prices firm at recent quotations. Both cargo and bunker steamers delayed.

The Virginian seems to be in a slightly worse condition than before. There has been no recession in prices, which are bound to keep up as

long as the present shortage of cars exists. Few shippers, however, are able to dispose of a large tonnage at the market, as contracts are taking practically all of their output.

Bunker demands continue large and shippers hope this will continue after the first of January, when the new price of $5 per ton becomes effective. It is hoped that next year Hampton Roads shippers will be able to secure a price for their coal commensurate with its value. There is a growing feeling that the period of ruinously low prices has come to an end.

Out of some 28 export cargoes moving out of Hampton Roads the past week 16 were carried in American vessels, an unusual number. No coal is shown as being shipped to Italy, and this is accounted for in part by the fact that a number of the steamers engaged in this trade are now carrying steel for the Italian Government.

Prices, subject to change without notice, for Pocahontas and New River run-of-mine are as follows: For cargo shipment, both coastwise and export, $7.50@8 per gross ton; on track, for local consumption, $7@7.50 per net ton; bunker coal, $8@8.50 per gross ton plus 10c. per ton trimming. Anthracite, $9 per net ton, delivered.

PANAMA CANAL

Only one coal cargo passed through the Canal during the week ended Nov. 11, the "Sorata" from Liverpool to Valpariso with 4,502 tons.

Ocean Shipping

OCEAN FREIGHTS

Tonnage is still scarce and rates advancing, freights now being quotable about as follows:

	Nov. 20	Nov. 27
West Coast Italy	$26.40@28.80	$30.00 about
Marseilles	25.20@27.60	28.80 about
Barcelona*[2]	21.60@24.00	24.00@26.40
Montevideo	13.20@14.40	14.40 about
Buenos Aires	13.20@14.40	14.40 about
Rosario	14.40@16.80	16.80 about
Rio Janeiro	11.50@12.00	12.50 about
Santos	12.00@12.50	13.00 about
Chile (good port)	8.00 about	8.00 about
Havana	4.00 about	4.00 about
Cardenas, Sagua	5.50@6.00	5.50@6.00
Cienfuegos	6.00@6.50	6.00@6.50
Port au Spain	7.50@8.00	7.50@8.00
St. Lucia	7.50@8.00	7.50@8.00
St. Thomas	6.75@7.25	7.00@7.25
Barbados	7.50@8.00	7.50@8.00
Kingston	6.50@7.00	6.75@7.00
Curacao[1]	7.00@7.25	7.00@7.25
Santiago	6.50@7.00	7.00 about
Guantanamo	6.50@7.00	7.00 about
Bermuda	5.00@6.00	6.00 about
Vera Cruz	6.50@7.50	7.00@7.50
Tampico	6.50@7.50	7.00@7.50

* Spanish dues for account of cargo. [1] And p.c.
[2] Or other good Spanish port.

W. W. Battie & Co.'s Coal Trade Freight Report.

Note—Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge."

COASTWISE FREIGHTS

So little free coal is to be had at Hampton Roads that there is practically no inquiry for tonnage. From $2@2.50 is mentioned as the range of rates, depending upon size and destination. Freights from Philadelphia have eased off somewhat, so few shippers being in position to accept bottoms. To Providence and New Bedford as low as $1.50 has been quoted on sail tonnage within a few days.

From New York also to Long Island Sound ports freights are considerably modified; $1.35 is now the market to Providence, as against $1.70 a week ago. Detention is the rule at the anthracite piers, and until shippers can take boats with some assurance of loading within a reasonable time freights are likely to remain relatively easy.

OCEAN CHARTERS

Coal charters have been reported as follows during the past week:

PHILADELPHIA

Vessel	Destination	Tons	Rate
Quickstep	Bermuda	325	$4.25
Lodaner	Havan		
H. O. Barrett	Cienfuegos		

BALTIMORE

Suffolk	Rio Janeiro		
Ellerslie[1]	River Plate	2,488	
Torne	Gothenburg	1,963	
Dictator	Nipe Bay	623	
Suffolk	Rio Janeiro	2,868	
Jersey City	Chile[2]	2,955	

VIRGINIA

Pamelia	Spain	1,392	13.50
Arna	Rio Janeiro	3,250	
Craster Hall	Rio Janeiro	2,759	
Kennebec	Barbados	1,913	
L. M. Baxter	Cienfuegos	1,153	

[1] Or Virginia. [2] Or Peru ports.

VESSEL CLEARANCES

The following vessels have cleared with coal cargoes during the past week:

NORFOLK

Vessel	Destination	Tons
Sedgwick[3]	Hamilton, Bermuda	728
Panaman[6]	Buenos Aires, A. R.	7,281
Anna R. Heidritter[3]	St. George, Bermuda	1,040
Asuncion de Larrinaga[13]	Bahia Blanca, A. R.	6,526
Muskegon[7]	Callao, Peru	1,143
Jolanda[4]	La Plata, A. R.	2,740
Clare[4]	Buenos Aires, A. R.	1,150
Graafaxe[4]	Antilla, Cuba	1,832
Jerome Jones[4]	San Juan, P. R.	2,808
Mikesan Maru[4]	Havana, Cuba	4,172
H. V. Fisker[8]	Montevideo, Uruguay	2,240
Saint Hugo[9]	Mejillones, Chile	7,209
Winneconne[7]	St. Thomas, D. W. I.	2,774
Frontenac[10]	Santiago, Cuba	2,432
Wearwood[9]	Kingston, Jamaica	4,556

NEWPORT NEWS

Maipo[11]	Callao, Peru	3,140
Suffolk[2]	Rio de Janeiro, Brazil	6,518
Stanley M. Seaman[2]	Humacua, P. R.	1,432
Muskegon[7]	Callao, Peru	3,645
Santa Catalina[3]	Iquique, Chile	1,482
Dorothy Palmer[2]	Barcelona, Spain	3,948
George D. Edmonds[2]	Manzanillo, Cuba	792
Craster Hall[2]	Rio de Janeiro, Brazil	5,700
Wethersfield[2]	Santiago, Cuba	2,400
John B. Biemiller[2]	Cadiz, Spain	1,507
Paris[2]	Sagua, Cuba	1,800
Alderney[12]	Caldera, Chile	1,010
Alderney[12]	Valparaiso, Chile	969

PHILADELPHIA

Quickstep	Bermuda	325
J. Edward Drake	Fort de France	
Thomas L. James	Gibara	
Henry Tegner	Puerto Padre	329
Hope Sherwood	Barcelona	522
Rimfaxe[2]	Manzanillo	
N. M. Porcella	St. Croix	466

BALTIMORE

Franklin	Egypt	6,160
Torne	Sweden	3,511
H. G. Foss	San Domingo	1,199

[1] Pocahontas Fuel Co. [2] Berwind-White Co.
[3] Castner Curran & Bullit. [4] Baker-Whiteley Co.
[5] Smokeless Fuel Co. [6] Virginia Coaling Corp.
[7] Maryland Coal & Coke Co. [8] Houston Coal Co.
[9] Northern Coal Co. [10] C. G. Blake Co.
[11] Island Creek Coal Sales Co. [12] C. & O. Coal & Coke Co. [13] Clinchfield Fuel Co.

Lake Markets

PITTSBURGH

Car situation not improved. Buyers deferring purchases. Cessation of Lake shipments changes differentials between grades.

The car situation is about the same as for two weeks past. No material improvement has come from the embargoes placed by the railroads and the strenuous efforts they have made to get cars back on their lines, nor has there been any large return of empties from the Lake ports, though shipments in the Lake trade are now practically over. The weather has been much more favorable than usual at this time of year.

The spot market is a shade lower than a week ago, about 50c. on steam and about 25c. on gas, as to mine-run, while slack is relatively stronger, commanding about the same price as mine-run. Buyers are all looking for a lower market, on account of the Lake shipping season ending and in view of this widespread opinion it is a question whether the market really is going to decline, for sellers have been staying out of the market as much as possible, feeling that each week they can delay purchases means a gain to them. The pursuit of this temporary policy may have produced the event the buyers have been endeavoring to anticipate and it is easily possible for coal to be higher next month.

The end of the Lake shipping season seems to be reflected in a widening in the price spread between steam and gas coal, now fully 50c., as well as in the approach of slack to the mine-run price. We quote slack and mine run for spot shipment at $4.25@4.50 for steam and $4.75@5.25 for gas, per net ton at mine, Pittsburgh district. Byproduct coal has brought $5 in several instances.

TORONTO, CANADA

Conditions slightly improved though scarcity still prevails. Increased demand and shipments coming forward slowly.

There is a slight improvement in market conditions and prices are more settled. Supplies, however, remain very low with an increased demand, owing to the setting in of cold weather and deliveries are much delayed as shipments are coming in slowly.

Quotations for best grades per short ton are as follows: Retail anthracite egg, stove and nut, $9; grate, $8.75; pea, $8; bituminous steam, $9; slack, $8.50; domestic lump, $10; cannel, $10. Wholesale f.o.b. cars at destination, bituminous three-quarter lump, $8.50; slack, $8; smokeless coal is off the market.

The Canadian government is taking action with a view to controlling the price of coal. As a preliminary step information has been asked of dealers as to the amount they had on hand on Sept. 26, when the coal was purchased, the prices paid and the prices charged to consumers. Other information concerning existing contracts and the re-sale of coal is also required. Whether any further measures will be taken, will depend on the nature of the replies received.

CLEVELAND

Unsettled market prevails. Cars moving slowly and supply smaller. Lake coal still being shipped from mines. No higher prices expected.

The local market has been anything but steady for the past week and from present indications will remain uncertain for some time. Prices for shipment are held up one day and the next day are decidedly lower. Buying for speculation at this time is a big gamble and the majority of the brokers are holding off and waiting for the prices to become more settled.

Coal has not been coming into Cleveland in any great quantities but the demand does not get much stronger. Most of the big buyers are pretty well stocked up and big sales on spot coal are becoming less frequent. The retail dealers are still buying as most of them have no storage space and the cold weather has stimulated sales. If we have a heavy snow storm that ties up the railroads so that the stock piles will have to be used the market will experience a rapid raise. The railroads are barely moving coal now and when it gets to Cleveland it moves still slower from one road to another. Snow will also help prices to some extent, as each day there was a snowfall the local market received from 25c. to 50c. more per ton for coal on track.

There has been coal sold as low as $3 at the mines during the past few days and also as high as $4.75 for the same grade; the low-priced coal was for the Cleveland market and the high-priced for the Buffalo market, which still appears to hold up prices better than all others. Ohio coals are going to points today that they have never reached before and never will under normal market conditions.

The majority of operators now believe that $2 will be a low price for coal at the mines when next year's contracts are made. The small country dealers are now buying all the coal they can, the cold weather having stimulated their trade. Gas has been cut off from all manufacturing plants in cities where the gas company's franchises call for the home to be supplied first and this has placed a great many additional plants in the market for coal. Gas will not be turned on again until next spring and as no one seems to want to contract at this time these same plants will have to buy their coal from day to day on the open market.

Domestic coals and coke have not suffered any reduction in price since they started to rise and smokeless coals are hard to buy at any price. Mine-run smokeless coal is bringing as high as $7 per net ton f.o.b. mines. Anthracite is above circular and hard to get at any price. Gas coal either Pennsylvania or West Virginia fell off slightly the past few days, due more or less to the embargoes that are now in effect. Most of the coal sold during the past week was for shipment East or to the smaller towns around Cleveland and to points in the Mahoning Valley to replace Pittsburgh and Youghiogheny coals.

Following are the market prices per short ton, f.o.b. Cleveland:

	Three-quarter	Mine-run	Slack
No. 8	$5.00@5.25	$4.75@5.00	$4.75@5.00
Cambridge	5.00	4.75	4.75@5.00
Middle Dist.	4.50	4.25	4.25@4.50
Hocking	4.50	4.00	4.50
Youghiogheyn	5.75@6.00	5.50	6.00
Pittsburgh	5.75	5.50	5.75
Pocahontas		8.00	
Fairmont	5.25	5.00	5.00

DETROIT

Demand for steam coal is active at high prices. Frosty weather brings rush of inquiries for domestic.

Bituminous—Despite the high prices at which it is held steam coal is in active demand among the local consumers. The supply is limited and as yet reflects no improvement from the withdrawal of embargoes by the Louisville & Nashville and Chesapeake & Ohio. Jobbers believe a better supply will be at hand as soon as shipments over the southern roads begin to reach Detroit.

Virtually all domestic sizes carry a quotation of $5 at the mines. Actual winter weather has greatly increased the pressure on retail yards. In some of the yards the supply has been exhausted and in others it is very low, while those of the dealers who are buying coal find that it is very difficult and at times impossible to get. Because of the high prices some of the retailers are not increasing their stocks. Mine quotations range from $5 for Hocking lump to $5.75 for smokeless lump and egg, with smokeless nut selling around $5.50 and West Virginia splint 4-in. lump and Kentucky splint lump at about the same price.

Anthracite—In the face of active buying stocks of anthracite in retailers' yards are steadily diminishing. There seems to be a slightly better supply of egg in most of the yards than of either stove or chestnut. Retail dealers are receiving $10.75 to $11 a ton for chestnut and from $10 to $10.25 for stove coal.

COLUMBUS

Lower temperatures cause another rush and prices as strong as ever. Heavy buying for stocking purposes.

In domestic circles retailers are buying mostly for immediate delivery; in fact, little business is placed for deferred shipment as jobbers and operators are loath to book orders in that way. With many of the contracts cleaned up, operators now want to take full advantage of higher prices. Retail stocks are light and in some sections there is a marked shortage. Pocahontas and anthracite are both selling well and the same is true of Ohio-mined grades.

The steam trade rules firm and all grades are moving well. Large users are buying as actively as possible, and are urging immediate shipment. Public service concerns have been short of fuel and in a few instances it has caused inconvenience. State and municipal institutions are having trouble to get a sufficient supply from their usual sources.

The end of the Lake season is now in sight as insurance goes off early in December. Lake shippers are making a last strenuous effort to get a large tonnage on board the last boats because of the prospects for a shortage in the Northwest. During the past week the Hocking Valley docks at Toledo loaded 52,000 tons.

Car shortage in all Ohio fields is still curtailing production and little help is expected soon. With the closing of the Lake season it is believed there will be some temporary help.

Prices on short tons, f.o.b. mines, are as follows:

	Hocking	Pomeroy	Eastern Ohio
Rescreened lump	$4.75	$5.00	
Inch and a quarter	4.75	5.00	$4.50
Three-quarter inch	4.50	5.00	4.50
Nut	4.50	4.75	4.50
Egg	4.50	4.75	
Mine run	4.50	4.75	4.25
Nut, pea and slack	4.25	4.50	4.25
Coarse slack	4.25	4.50	4.25

CINCINNATI

Cold weather has strengthened domestic demand, although the embargo has eased the market somewhat. Nut and slack very scarce, and prices for all grades continue high.

The coldest weather of the season, last week, served to stimulate the market, counterbalancing the effects of the embargo on shipments north while it lasted. Now that the embargo has been lifted much coal will go north, and supplies will be more limited in this market.

Eastern Kentucky coals showed remarkable fluctuations in price on account of the L. & N. embargo, going down to $3.25 or thereabouts for Miller's Creek and similar grades of mine-run and nut and slack while the embargo was on, and rising again to $4@4.50 with its lifting. Pocahontas lump is scarce at $6 f.o.b. mines, and steam grades are hardly to be had at any price. The river supplies are very limited, owing to low water. Some districts report a slightly improved car supply, and others that there has been no betterment in the situation. On the whole, the market is very strong.

LOUISVILLE

Lifting of Louisville & Nashville embargo increases contract deliveries north of Ohio River. Price trend still upward and car shortage not yet relieved.

Although protesting vigorously against the action, the Louisville & Nashville R.R. has obeyed the order of the Interstate Commerce Commission and has lifted the embargo on its coal equipment billed to points north of its lines. Eastern Kentucky operators on that line have accordingly resumed deliveries on contracts in the north central section in Louisville & Nashville equipment and have advised consumers in the territory of limited amounts of free coal for sale. First effects of lifting of the embargo in eastern Kentucky appeared to be fewer cars supplied.

Western Kentucky operators see practically no improvement in the situation as to cars. A somewhat larger volume of coal may be moving but car supplies are still very short of requirements and prices are tending higher. None of the retail stocks at Louisville are satisfactory, and in spite of vigorous efforts during the embargo period there was no success in accumulating surplus stocks.

Eastern Kentucky prices are increasing, block, f.o.b. the mines, being quoted up as high as $5.10; mine-run ranges up to $4.75 or slightliy over, and nut and slack prices are quoted around $4.50.

Western Kentucky quotes lump at $3; mine-run at $2.75@3; nut and slack, $1.75@2.

BIRMINGHAM, ALA.

Market continues strong, with trend of prices upward. Inadequate car supply most disturbing factor and complaints of fuel shortage more general than a week ago.

Inability of the mines to secure sufficient equipment to move the coal which they have contracted to furnish is still the chief cause of concern on the part of operators. Until the supply of cars is materially increased there can be no easing off either in the demand or prices. Steam coal is now quoted at $3.50@4, mines, with occasional bookings as high as $4.50 per ton.

Reports from points throughout Southern territory record the suspension of street railway lines, lighting, power and industrial plants, due to irregular and inadequate receipts of fuel. The demand for coal is such that numerous small mines are being opened and the output transported to markets by wagon. Domestic grades are now in good demand and quotations are from $4 to $5 per ton, mines. Mines are practically sold up for the balance of the year.

The railroads are taking a larger quota of company coal than recently. When cars are placed at the mines which hold contracts for supplying that particular road with coal, they are stipulating the number which must be loaded for them, which in many instances is 75 per cent. of the number placed.

Coke

CONNELLSVILLE

Further restriction in production through car shortage. Consumers generally indisposed to buy spot coke, but market higher nevertheless.

Coke production has been restricted by car shortage even more than formerly, and it is believed that many blast furnaces have had to bank for short periods or slow down their operations. If such is the case they are showing considerable fortitude in staying out of the spot coke market. Enough demand has developed, however, to stiffen prices, which are now nearly as high as at the top point a few weeks ago. Some off-grade furnace coke has brought $7.25, while standard brands are obtainable if at all, at not less than $7.50. Consumers still fail to show any interest in contract furnace coke, considering prices that would be asked and the doubt whether suitable deliveries would be made in any event.

Standard grades of foundry coke are bringing $9 and up to $10 in some instances. On the whole the foundry coke market is a shade easier than a week ago. There is only occasional interest in contract foundry coke.

The United States Steel Corporation has announced another general advance in wages to be made by its subsidiary companies, an average of about 10 per cent. It is expected that the advance will cover the coke region, but the H. C. Frick Coke Co. will probably not post its new scale until just before Dec. 15, when the general advance is announced to go into effect.

We quote the market approximately as follows: Spot furnace, $7.25@7.75; contract, nominal, $4; spot foundry, $9@10; contract, $5.50@6.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 18 at 398,299 tons, a decrease of 23,214 tons, and shipments at 372,859 tons, a decrease of 33,114 tons.

Chicago—Coke experienced a slight reaction during the past week, but towards the close it became very strong. Domestic sizes are unavailable, while foundry coke is being quoted at $8.50, the highest price in the history of the trade. No contracts for future delivery are being made, shippers preferring to take their chances in the open market and dispose of any surplus at the high spot prices prevailing.

Nominal prices per net ton, f.o.b. cars Chicago, are approximately as follows:

Connellsville	$9.00@10.50
Wise County	9.00@10.50
By-Product Foundry	9.50@11.00
By-Product Domestic	8.50@10.00
Gas House	6.75@8.00

St. Louis—Local byproduct demand is heavy for far Western and coast shipment, with little prospect of a car supply to permit shipment. The same applies to Northern shipment for domestic. Local demand continues to tax the output. Prices for St. Louis proper on domestic byproduct sizes are $5.75 delivered, and for gas house, $5. Scarcity of smokeless and anthracite has almost doubled the local domestic demand. Alabama coke is moving through here to points beyond on favorable rates, but no tonnage has been placed here as yet.

Birmingham, Ala.—Demand for coke in the local market continues strong, free tonnage of furnace and foundry coke both being extremely scarce. Representatives from Monterey, Mexico, were in the market recently trying to contract for a large tonnage to be used for smelting purposes, delivery to start at once, at the rate of about 1,000 tons per month, but producers were unable to handle the business. Furnace coke is particularly scarce, and one of the larger companies with furnace operations reports that it will likely have to divert some of its foundry coke to furnace use. Foundry grades are now quoted at $5.50 to $6 per ton, ovens. The movement of coke to Western territory has been facilitated recently by a more liberal supply of foreign equipment.

Middle Western

GENERAL REVIEW

Further advances due to extraordinary demand. Northwestern buying increased. Prices of all Indiana and Illinois grades 25 to 50c. higher. Anthracite very tight. Smokeless offerings increased.

The western situation is becoming tighter daily with prices steadily advancing on all grades, and the top does not seem to be anywhere in sight. Colder weather has increased the demand for immediate delivery. The quantity of coal being shipped has shown no appreciable increase and, if anything, tonnage is more difficult to obtain. The Louisville & Nashville lifted the embargo on movement of its cars north of the Ohio River, which resulted in the forwarding of considerable of this tonnage to Northern points at easier prices.

The car situation is no better, and all the mines are very short of men. Many new operations starting up are taking employees from shafts which have been producing steadily, and consequently the larger mines find their tonnage decreased. Big producers have contract business, while the smaller mines just opening up are getting the benefit of the prevailing high prices, having all their tonnage free, and besides, their quota of cars makes the car supply just that much worse at the older operations.

The Illinois State Public Utilities Commission is tabulating census figures furnished by the railroads of the state covering the car supply, which the Commission hopes will be the means of alleviating the shortage in a measure at least. Chicago coal shippers are very much disturbed over the attempt of the railroads to improve conditions by increasing demurrage, reconsigning and per diem charges. New tariffs have not yet been filed by the Interstate Commerce Commission as suggested by the carriers on account of protests made by the coal men.

Railroads and public utility concerns have been heavy buyers of tonnage on the open market recently. This coal is for storage purposes, and it is thought that buying is induced by fear of a railroad strike the first of the new year. The Board of Education in Chicago has permitted fuel contractors to substitute mine-run for lump-coal deliveries as specified, on account of inability of the contractors to supply lump tonnage.

CHICAGO

Western coals in stronger demand at higher prices. Eastern grades easier with increased offerings. Anthracite ordering brisk with supply short. Steam quotations as high as domestic prices.

Franklin and Williamson County domestic sizes are realizing $3.50 to $4.50. The mines are sold up from three to six weeks ahead and the demand from the Northwest and country districts is unparallel. A considerable tonnage has been sold at Eastern points and other sections heretofore supplied by Eastern coals, at high prices. Screenings and mine-run are selling readily at $3.75 to $4. Saline County operators are sold out for many weeks to come, but there has been a decline of about 10 per cent in car supply.

All of the mines in southern Illinois are very short of men. The demand from the North, West and South seems to be increasing daily. Inquiries are being made by many large consumers for coal for stocking purposes between now and the first of the year due to the attitude of the railroad fight over the Adamson 8-hr. law, and should the demand become more pronounced much higher prices are inevitable.

Considerable buying of central Illinois coal by railroads, public utility corporations, etc., has occurred this week at high prices, due to the possibility of a railroad strike the first of the year. Prices on all grades are thus kept at a very high range, lump selling at from $3.50 to $3.75 with screenings and mine-run averaging $3.50. No free coal is on the market from Fulton and Peoria Counties, the prices remaining practically unchanged.

Indiana coals have been somewhat easier this week because of a larger supply of Eastern grades in that territory as well as in Chicago, and less buying from Michigan points. However, there is very little reserve stock and this has kept steam sizes very strong at from $3.25 to $3.75 at the mines, with domestic sizes averaging well around $3.75. All the Indiana railroads are short of coal, and seem to have difficulty in getting enough of it to keep their trains running.

Spot sales of smokeless lump and egg have been reported as high as $6.50, with $5 for mine-run, but the market is less buoyant, due to increased receipts. The larger amount of free smokeless tonnage now in the Western market is due to an easier demand eastward and expected relief in the Lake situation. Offerings of Pennsylvania smokeless were somewhat more plentiful.

Hocking is easier due to increased shipments to its territory, prices being from 25c. to 50c. under quotations of ten days ago. Splint acted sympathetically in the same way, prices on lump running around $3.50 to $4. Kentucky shipments, while in perceptibly larger numbers during the week are still comparatively light, and prices show no change.

Quotations in the Chicago market are as follows, per net ton f.o.b cars at mines:

	Springfield	Fulton & Peoria Cos.	Clinton & Sullivan Cos.	Green & Knox Cos.	Carterville
Domestic lump	$3.50@3.75	$3.50@4.00	$3.50@4.00	$3.50@4.00	$3.75@4.00
Steam lump	3.25@3.50	3.25@3.50	3.50@4.00	3.25@3.75	.....
Egg	3.50@3.75	3.50@3.75	3.50@4.00	3.50@3.75	3.75@4.00
Nut	3.25@3.50	3.50@3.75	3.25@3.75	3.50@3.75	.....
Mine-run	3.00@3.50	2.75@3.25	3.25@3.50	3.25@3.50	.....
Screenings	3.25@3.50	2.75@3.25	3.25@3.50	3.50@3.75	.....

	Wilmson. & Franklin. Cos.	Saline & Harrisburg	Poca. & W. Va. Smokeless	Penna. Smokeless	Eastern Kentucky
Lump	$3.50@4.00	$3.50@4.00	$4.75@6.00	$4.75@5.50	$4.00@5.00
Egg	3.50@4.00	3.50@4.00	4.75@6.00	4.75@5.50	4.00@5.00
Nut	3.50@4.00	3.50@4.00	4.25@4.50	4.50@5.00	3.75@5.00
No. 1 nut	3.50@4.00	.....	.....	.....	.....
No. 2 nut	3.50@3.75	.....	.....	.....	.....
No. 3 nut	3.50@3.75	.....	.....	.....	.....
No. 1 washed	3.50@4.00	.....	.....	.....	.....
No. 2 washed	3.50@3.75	.....	.....	.....	.....
Mine-run	3.50@4.00	3.50@3.75	4.25@5.00	4.25@4.50	3.50@4.00
Screenings	3.50@3.75	3.50@3.75	.....	.....	.....

Hocking Lump $3.75@4.25. Splint Lump $3.50@4.25.

ST. LOUIS

Prices advancing on all grades but market is erratic. Outside buyers pay fancy prices. Car supply easier on some lines, but worse on others. Coal shortage felt here.

The present week was the reverse of the steady, thoughtful order of last week in the local market. The over selling of the past two weeks left but very little tonnage for the present week, and there is no limit to the recklessness displayed in some instances. Buyers were here from points in Indiana, Michigan, Ohio, as well as Chicago, the North, Omaha and Kansas City, and anything that would go to those points brought top prices.

The result is that there is an erratic market here and anything is liable to happen. The local demand calls for no high-grade excepting that coming in on contracts, and Williamson and Franklin County is catering to outside markets. There is a briskness about the trade at the present time that indicates an advance upon the slightest pretext. The top price of this coal is $4.75 for lump and egg. Screenings bring $3.50, the same as mine-run, and are eagerly sought by outside buyers.

The Mt. Olive and Staunton operators are taking care of the domestic trade not under contract at under $2, while most of their free tonnage is moving out of the city at $3 for screenings. The minimum for mine-run is $3.25, and from $3.50 to $4 for domestic sizes.

In the outside market Standard 6-in. is bringing as much as Mt. Olive. Two-inch is bringing a minimum of $3.25, which is the price of Standard mine-run, while screenings seem to be hovering around $3. In many instances the steam trade in the city are paying these prices.

There has been a few cars of anthracite and smokeless received this week. Some byproduct domestic coke from Alabama has moved to this market in place of anthracite.

There is considerable discontent expressed by the retailers and the steam trade over the arbitrary manner in which the Standard operators are ignoring local consumers and catering to markets that have never before bought Illinois coal. Some of these operators have retail yards in St. Louis, which have been without coal for several days because the outside market brought more money for coal. On the streets of St. Louis on Nov. 25 women were parading with placards demanding that the Mayor take some action to supply the public with coal the same as the Mayor at Terre Haute did.

The prevailing market for outside shipment is per short ton, f.o.b. mines:

	Williamson and Franklin Co.	Mt. Olive	Staunton	Standard
6-in. lump	$4.25@4.75	$4.00	$3.25	$3.25@3.50
3x6-in. egg	4.25@4.75	4.00	.....	.....
2x3-in. nut	4.25@4.75	4.00	.....	3.25@3.50
No. 2 nut	4.00	4.00	.....	3.25@3.50
No. 3 nut	4.00	3.50	.....	3.25@3.50
No. 4 nut	3.75	3.50	.....	3.00
No. 5 nut	3.50	3.25	.....	3.00
2-in. screen.	3.50	3.50	3.25	3.00
2-in. lump	.....	3.50	.....	3.25@3.50
3-in. lump	.....	3.50	3.50	.....
Steam egg	.....	3.25	3.50	3.25
Mine-run	3.50	....	3.25	3.25@3.50
Washed				
No. 1	4.25@4.75	4.00	.....	3.50@3.75
No. 2	4.25@4.75	3.75	.....	3.50@3.75
No. 3	4.00	3.75	.....	3.50
No. 4	4.00	3.75	.....	3.50
No. 5	3.50	3.25	....	3.25@3.50

KANSAS CITY

Situation somewhat easier, though prices continue very stiff.

As a result of the settling of the Oklahoma strike and the increased shipment into Kansas City of Arkansas coal the steam coal market is getting easier and the dealers are catching up on their storage. The price, however, continues to go up. The local dealers are buying on the open market and are now taking all the coal they can get. Some of them are filling their yards with a cheap north Missouri coal so as not to be caught without any supply in case of bad weather.

Most of the steam coal from the Bevier field has been selling in the St. Joseph and Omaha markets, very little coming into Kansas City. Screenings are scarce and are selling at $2.25 at the mine. A small amount of this grade comes to Kansas City from Bevier.

Some mine-run steam coal from the Rich Hill, Missouri, mines has been coming to the city; it sells at $3.75 and the freight is $2.50. Many small mines have been opened since the price has been increased and some coal is coming from these mines.

A very small amount of steam coal at high prices is coming from the Illinois field.

General Statistics

NORFOLK & WESTERN

Distribution of shipments for October of this year were as follows:

	Shipped	Tipple	Total
Pocahontas	1,412,621	11,207	1,423,828
Tug River	318,618	2,055	320,673
Thacker	267,376	7,944	275,320
Kenova	89,740	6,993	96,733
Totals	2,088,355	28,199	2,116,554

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts in October and for the 4 months ending October for years 1915 and 1916, in short tons:

	October				Four Months			
Destination	1916	%	1915	%	1916	%	1915	%
Tidewater	391,704	18	382,865	18	1,706,723	19	1,797,371	21
East	239,181	11	230,150	10	819,835	9	784,528	9
West	1,379,644	62	1,368,550	63	5,582,922	62	5,340,510	62
Total	2,010,529		1,981,565		8,109,480		7,922,409	
From Connections								
Bituminous	212,551	9	193,691	9	871,230	10	707,086	8
Anthra. (local)	473		316		1,094		921	
Anthracite	1,108		1,418		6,021		5,893	
Total	2,224,661	100	2,176,990	100	8,988,258	100	8,636,309	100
Company fuel	182,653		173,117		674,891		652,741	
Total	2,407,314		2,350,107		9,663,149		9,289,050	
Coke	55,121		33,983		117,556		111,319	

COAL MOVEMENT

Fuel shipments over 13 leading Eastern carriers for August and 8 months of 1915-16 were as follows, in short tons:

Classes and Railroads	August		8 Months	
Anthracite:	1915	1916	1915	1916
Baltimore & Ohio	114,456	81,436	791,298	940,220
Buffalo, Rochester & Pittsburgh	5,635	7,507	102,965	109,312
Buffalo & Susquehanna	379	277	3,974	4,282
Chesapeake & Ohio	1,807	1,741	9,544	9,733
Erie	802,059	773,059	5,914,445	6,318,174
Huntingdon & Broad Top Mountain	.....	35	249	465
Pennsylvania	743,257	1,001,198	6,811,293	7,767,748
Pittsburgh, Shawmut & Northern	221	1,165	7,277	8,484
Virginian	84	343	1,088	2,589
Western Maryland	26,471	28,702	215,116	225,301
Total	1,694,369	1,895,463	13,857,249	15,386,308
Bituminous:				
Baltimore & Ohio	3,153,116	3,181,407	20,977,130	23,789,978
Buffalo, Rochester & Pittsburgh	648,087	867,027	4,700,167	6,195,496
Buffalo & Susquehanna	93,813	140,483	633,461	1,002,274
Chesapeake & Ohio	2,236,625	2,326,348	14,409,337	18,234,032
Erie	545,868	723,916	4,067,966	5,709,212
Huntingdon & Broad Top Mountain	82,353	120,491	617,156	757,980
New York Central (Buffalo and east)	529,251	628,167	3,923,294	5,185,046
Norfolk & Western	2,762,018	2,781,001	16,643,548	20,677,785
Pennsylvania	3,847,575	4,292,627	27,703,075	32,576,476
Pittsburgh, Shawmut & Northern	183,428	270,382	1,439,839	2,018,442
Virginian	392,694	462,330	2,541,364	3,511,686
Western Maryland	820,115	864,638	5,542,097	5,555,741
Total	15,294,943	16,658,826	103,198,434	125,214,148

VIRGINIAN RAILWAY

Shipments over this road for September of this year amounted to 519,345 tons, as compared with 393,055 tons September last year.

FRANKLIN COUNTY, ILL., PRODUCTION

The estimated output of Franklin County, Illinois, mines for 1916 is 10,500,000 tons; this is one-sixth of the production of the state, which is estimated to be 62,000,000 tons for the year 1916. The production for the first 10 months of the year, by months, was as follows:

Month	Production	Increase[1]	Time Worked, %
January	1,038,087	124,053	91
February	1,062,353	501,508	87
March	745,962	229,869	62½
April	369,480	5,349	30
May	537,407	177,896	36½
June	698,474	44,901	46
July	656,596	16,301	49½
August	864,364	151,850	63
September	971,440	56,814	73
October	1,106,325	117,062	74
Total	7,948,488	1,425,603	

[1] As compared with the same month last year.

Foreign Markets

GREAT BRITAIN

Nov. 16—The market continues to be very flat and for spot coal, prices have eased off still further. For later loading, limitation prices are maintained.

Best Welsh steam	Nominal
Best seconds	Nominal
Seconds	$7.20@7.80
Best dry coals	6.72@6.96
Best Monmouthshires	7.20@7.44
Seconds	6.96@7.20
Best Cardiff smalls	4.80@5.04
Cargo smalls	4.44@4.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—The volume of chartering is small, tonnage being still very scarce. The outstanding feature is the firmness for Gibraltar.

Gibraltar	$13.20	Port Said	$14.40
Marseilles	14.04	Las Palmas	8.40
Genoa	14.28	St. Vincent	9.00
Naples	13.80	River Plate	9.60
Alexandria	15.00		

Financial Department

St. Louis Rocky Mountain & Pacific

The ninth annual report of this company for the year ended June 30, 1916 submitted under date of Sept. 15, reads in part as follows:

Since the last annual report, a further exchange has been made of the securities of The Atchison Topeka & Santa Fe Ry. Co. which were received for the railway property, for your bonds to the extent of $576,000, so that the outstanding bond issue as of July 1, 1916 is $5,162,000, and there still remained in the hands of the Trustee $764,000 4% Atchison, Topeka & Santa Fe bonds. Further exchange will be made as opportunity offers.

The amount of $42,093 52, representing 3c. per ton on all coal mined during the year, was paid to the Trustee and $48,000 first mortgage bonds were purchased for the sinking fund. The Board of Directors during the fiscal year declared dividends of 5% on the $1,000,000 preferred and 2% on the $10,000,000 common stock.

The coal production for the fiscal year, the number of days each mine operated and the average daily tonnage for each mine was as follows:

Mine	Tons Produced	Days Operated	Average Produc.
Gardiner	197,670	273	724
Koehler	515,183	288	1,788
Brilliant	210,556	260	800
Sugarite	172,234	271	635
Van Houten	499,830	277	1,804
Total	1,595,473		5,751

The coke production was as follows:

Koehler, 210 Ovens; 350 days operated; produced, tons	93,866
Gardiner, 200 Ovens; 365 days operated; produced, tons	93,098
Total	186,964

Your company has continued to give close attention to the safety of its employees, and to the health and comfort of the employees and their families.

Outside of minor safety measures, all miners have been provided with portable electric lamps, which are giving excellent satisfaction. Lamp houses for the cleaning, repairing and charging of these lamps have been erected at each mine. Smoking and carrying of open lights is prohibited inside of all mines, which measure should add greatly to the safety of the properties.

While everything is being done to prevent accidents, we find that even with the greatest of care it seems impossible to entirely prevent them. Settlements were made with all injured employees, and the company has no damage suits or unsettled claims. The hospital at Gardiner has been enlarged and is now sufficient to take care of all demands. Two visiting nurses were added to the medical staff whose duty it is to look after the health of the people living in the coal mining towns.

A superintendent has been appointed with general supervision over education, sanitation and general welfare.

The mines and mining plants are all in good condition, and sufficient coal has been developed for continuous future operations. The new steel tipple at Koehler is in operation; additions to the Sugarite tipple have practically been completed.

At Koehler extensive repairs have been made at the coal-washing plant, and all ovens have been rebuilt so as to allow mechanical operation, which will shortly be installed.

At Gardiner thirty new ovens are in course of construction, and changes for mechanical operations at that point are also being planned.

When these changes and additions are completed the company will have 440 coke ovens, with an annual capacity of 250,000 tons of coke.

The demand for coal has not been good, while the coke demand has been in excess of the supply. The former was caused by excessive competition during a mild winter, while the latter was stimulated by the great demand for metals, especially copper. The definite pacification of Mexico would undoubtedly greatly help our market in that country.

The sum of $104,184 83 was taken out of earnings to pay for improvements and betterments, including the lamp installation and hospital extension hereinbefore mentioned.

INCOME ACCOUNT

	1915-16	1914-15
Coal mined (tons)	1,595,473	1,644,222
Coke produced (tons)	186,964	78,381
Coal and coke sales	$2,486,271	$2,465,215
Cost, expenses, taxes, etc	1,928,966	1,815,208
Net earnings	$557,305	$650,007
Other income	177,365	207,752
Total net income	$734,670	$857,759
Interest charges, etc	$283,201	$414,004
Depreciation reserve, etc	118,342	111,564
Preferred dividends (5%)	50,000	50,000
Common dividends (2%)	200,000	(1) 100,000
Surplus	$83,127	$182,191

BALANCE SHEET JUNE 30

Assets	1916	1915
Prop., good-w,, etc	$16,696,132	$16,596,001
Investment in—		
A. T. & S. F. Ry. 1st M. 4s, etc	868,520	1,537,200
Subsidiary co's	290,341	290,341
Cash	336,860	273,857
Accounts receiv'le	232,815	203,071
Materials, etc., on hand	71,483	47,255
Sundry accounts	15,208	19,603
Spec dep red bds	407	10,240
Total	$18,511,765	$18,977,568
Liabilities	**1916**	**1915**
St. L. R. M. & P. Co.:		
Common stock	$10,000,000	$10,000,000
Preferred stock	1,000,000	1,000,000
First M. bonds	5,162,000	5,786,000
Accounts and wages payable	141,833	141,706
Accrued int., etc	131,850	144,725
Pref. stock divs	12,644	12,552
Sundry accounts	26,510	27,735
Reserved for depr	740,192	634,468
Surplus	1,296,736	1,230,382
Total	$18,511,765	$18,977,568

Pacific Coast Co.

The nineteenth annual report of this company for the year ending June 30, 1916, issued under date Oct. 2, says, in part:

Results—Gross earnings increased $928,064 and net earnings $298,046. The net earnings of the Pacific Coast Steamship Co., including charter earnings of the Pacific Coast Co., increased $226,344. The net earnings of the Pacific Coast Coal Co., including lumber sales, increased $70,030. The net earnings of the Pacific Coast R.R., formerly Columbia & Puget Sound R.R., increased $19,445. Payments by the Chicago, Milwaukee & St. Paul Ry. for the use of tracks of the Pacific Coast R.R. amounted to $50,418. This item, however, for accounting reasons, appears under the heading of rentals.

The net earnings of the Pacific Coast Ry. decreased $14,384. Rentals, dividends, grain warehouses and Port San Luis Wharf earnings decreased $2,608. Coal busines was somewhat better during the year and, with the increasing price of fuel oil, it is believed the demand for coal will increase.

Normal conditions and operation of mines to capacity can hardly be expected until the return of steamship tonnage, now more profitably engaged elsewhere, to the Pacific.

Note—For previous annual report of this company see Vol. 9, p. 522.

Continental Coal Co.

The following interesting data concerning this company has been abstracted from a statement issued by a committee of the first mortgage bondholders, under date of Oct. 24, 1916:

Foreclosure Sale—Under decree of U. S. District Court for the Southern District of Ohio, the property is advertised to be sold under foreclosure. Unless the railroads, as guarantors, pay the principal and interest on the bonds before the sale, or unless some satisfactory purchaser appears, it will be necessary for the bondholders to bid in the property in order to prevent its loss. The upset price is $500,000 and the proceeds are to be applied to payment of (1) costs of sale, (2) expenses and compensation of receiver and the principal and interest of receiver's certificates (now amounting to $425,000), (3) expenses of foreclosure case, (4) any balance to the bondholders.

Railroad Guaranties—Your committee brought actions in the Supreme Court of New York County against the Toledo & Ohio Central Railway Co. and the Hocking Valley Railway Co. upon the guaranties. The cases against the Toledo & Ohio Central finally resulted in a judgment in our favor for the full principal amount of all bonds deposited up to midday of Oct. 19, 1916 (1,425 in number out of the total outstanding 1,569), with interest from the date of first default and costs, or an aggregate judgment of $1,547,982.33. Interest will accrue on this judgment at the rate of 6 per cent. from its date. All bonds deposited too late to be included in the judgment will either be covered by its payment, if and when paid, or covered by supplemental suits.

Mortgaged Property—The foreclosure sale will cover all the properties of the company, which include about 450 acres of coal lands owned in fee and about 15,000 acres held under mining leases, all situated in the Hocking Valley field, in the Counties of Athens, Perry and Hocking, Ohio. In addition there are about $639,000 of prepaid or advanced royalties, about $100,000 of repairs, additions and improvements, made out of the proceeds of receiver's certificates, any cash balance remaining from the said receiver's certificates (being at this date approximately $100,000) and the receiver's share of the profits of operations under the contract with the Continental Mining Co., probably amounting to about $40,000. The aforesaid coal properties are estimated to contain about 76,000,000 tons of 1¼-in. coal.

From about July 1, 1905, until about Mar. 4, 1916, all the above-mentioned coal properties were under lease to the Sunday Creek Coal Co., and the rental therefor included interest and sinking fund payments on the bonds and the royalties payable to the several lessors. At the time of such lease, the stock of the Sunday Creek Coal Co. was owned by the Toledo & Ohio Central Railway Co. and the Hocking Valley Railway Co., the railroad corporations which severally had executed their guaranties on the bonds of the Continental Coal Co. In 1914 these railroad companies were required to dispose of such stock under the decree entered in the Government suit against them under the Sherman anti-trust law. Subsequent to the sale of such stock by the railroad companies, the Sunday Creek Coal Co. defaulted in its obligations under its lease from the Continental Coal Co., as did also the railroad companies in their obligations under their guaranties, resulting in the defaults of the bonds of the Continental Coal Co.

In August, 1915, the mines of the Continental Coal Co. ceased operating. These mines were subject to minimum royalty payments aggregating about $200,000 a year. The result of the cessation of operation was not only to allow the property rapidly to depreciate, but also caused serious danger of forfeiture of all the leased property. The most important leases owned are (1) that from the Sugar Creek Co. containing an estimated amount of coal of about 37,000,000 tons, and (2) that from the Republic Coal Co. containing an estimated 23,000,000 tons. The Continental Coal Co. had no selling force and it was imperative that the mines at once be put into operation. There was required also for immediate use $425,000, namely, $150,000 to pay past-due royalties in default, $75,000 for cleaning up the mines, about $150,000 for necessary repairs, and the balance to cover a loss in operation and payment of royalties until the mines could be gotten into operating condition. The committee on May 2, 1916, with the approval of the court, entered into a tentative agreement with George M. Jones, providing for the issue of $425,000 6 per cent. receiver's certificates to be sold at a price of not less than 98½ per cent., and the execution of an operating contract by the receiver with the George M. Jones Coal Co. (of which Mr. Jones owns all, or substantially all, the stock) for a period of five years, whereby the George M. Jones Co. would agree to purchase from the receiver all the coals produced at the mines, less a commission and selling charge of 10 per cent. of the selling price, the minimum commission to be 10c. per ton. As a result the properties were put into immediate operation, producing these earnings:

	3 Mos.	Sept. 1 to
Sales of coal ($387,103), miscellaneous ($6,005)	$393,108	$167,152
Expenses pay-rolls ($293,180), supplies ($19,235), royalties ($26,212), general overhead ($16,362)	354,988	145,432
Net profit	$38,120	$21,720